

REPLICATING USER EXPERIENCE OF A PHYSICAL PRODUCT IN DIGITAL ENVIRONMENT: CREATION OF A GUESTBOOK APPLICATION

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Countless physical products have their digital equivalents, but do the products have a similar impact on their users? This thesis studies the user experience and its evolution when a physical product is recreated in a digital environment. To study the changes and similarities of the user experience, a guestbook application was created. The application was designed based on user needs and ideas gathered in a half-structured focus group interview. After implementation, the group used the digitized product, completed a user experience questionnaire and was interviewed about their experience and thoughts. The results of the evaluation suggest that the content of the guestbook is what initially makes a guestbook, and therefore the user experience can be replicated by ensuring the digitized product is easy to use, follows convention and provides easy access to the content of the guestbook and an easy way to create valuable content. The digitized product was seen to have more creative and spontaneous value, but was described as less formal than the traditional, physical guestbook. The results of this thesis hold value to any individual or company seeking to successfully replicate physical products in a digital environment.

Keywords: user experience, guestbook, digitization, emotion

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1 INTRODUCTION

In the spirit of technology-related hype as well as being environmentally friendly, more and more physical products are being transformed into digital ones. The 21st century has changed the world by making a wide number of everyday objects obsolete or at least rarely used specialties. Mobile electronics keep on replacing items that used to be separate physical objects. No more notepads, no more calculators, no more flashlights - it's all in our phones and laptops now.

Digitizing physical objects is not a new phenomenon: it has been there since the beginning of computing. A rather well-known example of this is Microsoft Solitaire, a digital card game based on a physical card game of the same name, that first appeared already in Windows 3.0 when it was released in 1990. According to Microsoft, the familiar game acted as a soothing element to users in an otherwise unfamiliar environment while subtly teaching its players to use the mouse (Garreau, 1994). It makes sense - imagine a person who has never used a personal computer before. Where do they start their journey to mastery? How do they learn the basics of this new, exciting piece of technology, let alone master it? The user can find it comforting to see a familiar concept in a new environment, and grasp the opportunity to enhance their skills with the environment by doing something they already understand the basics of (Garreau, 1994).

Another example for using well-known themes to familiarize users to a new environment is the concept of a desktop in personal computers. The desktop was purposefully designed to remind the user of a physical workplace desktop to support the user with the new environment by using the existing mental model of an office desk with the small trash can, some files in folders and a calculator along with some papers. The user is able to make use of the existing mental model as the design lessens the cognitive load of the user. The point here is to familiarize users with the new environment by using well-known concepts from the physical world to make the new environment seem more familiar and therefore easier to learn.

The trend continues to this day: a large amount of the present-day web conventions are adaptations of traditional print press conventions (Krug, 2006). It is not always easy to

recreate these physical mental models in digital forms of products, nor are the end products always successful in their attempts to replicate the user experience of the original, physical product.

With some products, the process of transforming to the digital environment, or in other words implementing products in a digital form to be used in digital devices such as computers, smartphones tablet computers, can be straightforward - it is rather easy to implement a notepad and a pencil or text input to, for example, a tablet computer. Digitizing products can also bring out possibilities and added value that would not have been possible to create in the physical product: for example, a board game that automatically calculates the score or presents immersive animations to go with the role game already seems ordinary at present.

Games, photos, books, and one could even say memories, are being digitized - but can a digital experience replace the original? One can store their photos, e-books, documents and art in their cell phone, tablet computer or PC, but how does the emotional experience and relationship to items, no longer physical and concrete, change? Is emotion more intense when the object is tangible?

The aim of this thesis is to understand and report the challenges and opportunities that lie in replicating physical products in digital environments. For this purpose, a case study will be conducted about a well-known product with sentimental value and a long history: a guestbook. With the help of the concept of the traditional, physical guestbook and a newly created guestbook application for tablet computers I will compare the user experience of the two.

A guestbook can be seen as a suitable example to be used in this research for several reasons. The concept of a guestbook has a long tradition serving as a log of visitors in public facilities such as museums, churches and personal celebrations and spiritual or non-spiritual ceremonies. This frequency in documenting has been characteristic to Finland since the 14th century when churches and state started keeping records of for example births, deaths and marriages along with records of young men eligible to be sent to war (Väestörekisterikeskus, 2017).

In addition to simply listing visitors and their origins, a guestbook can be used to store greetings or poems relating to the event. A physical guestbook can be considered an

object of high sentimental value, and it is stored and savored long after the event is over.

The sentimental factor of a guestbook raises multiple questions: What are the factors that make a physical guestbook likeable to its users? What are the features that make a user want to hold onto a book containing - in the end - a fairly small amount of content? Why does a guestbook evoke emotions in its user? What are the affordances of a guestbook? Is it possible to replicate the user experience when this physical object is recreated as a digital one?

In this thesis, I will find out what are the features in a guestbook that make it so desirable after years of use from generation to generation, and how the same user experience can be replicated when implementing a digital version of a guestbook. I will not only create a digital guestbook with the features that the physical one contains, but improve it in ways that are only possible in a digital environment. In the end, I will find out if a user can attach as much emotion into a digital product as to a physical one. I will study the elements that define the user experience of a guestbook, and report the emotion and experience of a user while using the two different guestbooks. The positives and negatives of the user experience will be categorized and analyzed.

The outcome of this thesis will be a guestbook application along with data to justify the design decisions made during the project. The thesis will also report if there are factors in digital environment that can serve as value adding elements without distinctly changing the user experience of the product. The results of this thesis will be beneficial for the companies pursuing to recreate physical products in digital environments by supplying them with information about the differences and similarities in user experience of physical and digital products. The results will define how the user experience of a physical product can be replicated and how it changes when a guestbook is transformed into a digital format. The documentation will specify which approaches were considered and what are the justifications for choosing one approach and discarding another.

The research begins by going through relevant studies relating to the topic, first the history and emotion behind a guestbook. I will also address digitization as a phenomenon and link it to this case study, along with the challenges and opportunities

of digitization overall and in this context. These studies are a base for the design process of the application.

The aim of the design is to create a highly usable application that successfully replicates the user experience of a physical guestbook, while also providing extra features and value to the user. The most important aspect in the application is its well thought out usability. The design process starts with interviewing a focus group. This interview illuminates the needs, wants, attitudes, opinions and emotions relating to the original and the digital guestbook. Personas and key path scenarios based on the interview assist the user-centered design process. The final user interface design is documented by wireframes, screens, a moodboard and reports on interaction design and the style of the product.

The application implementation time frame partly overlaps with the design phase. The implementation is only documented briefly, as the stress of the research is on design and evaluation. A minimal usability test is conducted for the application while carrying out a user experience evaluation. The evaluation consists of tasks performed with the product, an interview about the physical and digital guestbooks and a survey.

After testing, the interview data is analyzed and possible usability problems are reviewed based on feedback from the interviewees and the data from the evaluation. Finally, the question on how user experience is affected by the digitization of the concept is discussed.

2 BACKGROUND

This chapter addresses the background of the main themes: the guestbook itself, emotion linked to using it, digitization and the challenges and opportunities it offers. The literature answers the questions of how user experience is formed in the context of a physical guestbook and how this experience can be replicated in a digital environment. The research in this chapter is a base for the methods used in the design process.

Which factors make a guestbook particularly emotive? Which ensure a good user experience? Which make the user experience negative? What is it about a guestbook that could be done better in a digital version?

2.1 The Guestbook and Emotion

The Merriam-Webster online Dictionary (2017) defines a guestbook as “a book of blank pages in which visitors or guests at an event (such as a wedding or funeral) or a place (such as an art gallery) sign their names”.

The definition sounds straightforward and simple. Guestbook is a familiar concept in Western cultures. As said, it can be found and used in a variety of events from family-related celebrations and memorial services to formal settings in museums or for example conferences. A guestbook is something one does not tend to throw away, which is why historical guestbooks can offer value to various kinds of research. A guestbook has been the source of broad historical studies because of the unique information its contents offer. They have been used to study for example language and communication (Noy, 2008a), symbolism (Noy, 2008b), dialogue and free speech (Morris, 2011), travel culture and literary practices (James & Vincent, 2016), and traumatic history (Chen, 2012).

Guestbooks today are not just plain notebooks with conservative content. The internet with its endless capabilities to share inspirational do-it-yourself -projects and buy the fruit of other people’s labor through web stores has enabled a flowering business for crafty guestbooks. The content, as well, is not just text anymore. The owners of the guestbooks go through great trouble adding in photos, decorations and small keepsakes after the event.

A guestbook can gather a lot of content in a short period of time, since the threshold to use it is low - it is generally a well-known concept and easy and quick to use. The style of a guestbook is often contextual, yet inside the context it is fairly easy for a guest to understand the desirable style and the level of formality of the text and signature. Some events and, naturally, some guestbook owners require a certain level of formality. Individual owners can be very relaxed about the contents of their guestbooks and encourage creativity. Others find guestbooks to be highly formal and only welcome greetings that fit the form they have set. Guests, of course, have their own view and act accordingly when signing the guestbook.

This emotion towards guestbooks exists quite surprisingly in both public and personal guestbooks (James & Vincent, 2016). The users can share quite emotional messages in both kinds of guestbooks, as well as guestbooks in events considered both sad and happy. A common example of emotion in personal guestbooks is a guestbook in a family celebration such as a graduation party. Friends and family leave congratulatory and supportive messages about the future and reminiscing stories about the past of the person whose special day it is. Another traditional example is the guestbooks used in funerals. These messages contain sorrow and longing along with messages of love and compassion for the family of the passed.

As James & Vincent (2016) argue, public or non-personal guestbooks can contain emotion all the same. Veikkaus (2015), the Finnish national betting agency, has a guestbook for lottery winners, who traditionally visit their head office for a complimentary, celebratory cup of coffee after winning big. Anonymous winners share emotional messages in the book about being able to let go of stress and their disbelief for the luck they have encountered. The messages also state deep hopes and dreams for the future, such as finally paying off the house or spending more time with the family with the financial security and independence provided by the jackpot. The signers are understandably filled with emotion at the moment of the writing, and they insert their feelings into the guestbook.

What makes a guestbook so prone to evoke emotion? One reason for the appreciation of the concept might be its presence in the important events and rituals of life - name giving, religious events in teenage years, graduations, weddings, birthdays and funerals. In addition to emotional moments shared with family and friends, a guestbook can be found in public places that evoke emotion all the same. Museums, art galleries and

holiday destinations can all arouse feelings, negative and positive. This is an interesting phenomenon, since the guestbook signatures in personal events are rarely negative. A study by Isaac (2015) found that a public guestbook in an emotional setting can evoke positive emotions such as admiration and delight as well as negative ones - unpleasantness and even discomfort. A public guestbook is a unique way to express opinions and thoughts, and seen as a rather faceless object, it is exposed to negative emotions. The question of why do people ever share such strong emotions in a guestbook is a key question if this user experience is to be replicated.

2.2 Examples of Digitization

Since digitization is not a new phenomenon and is getting wildly popular, there are plenty of examples of physical products that have digital versions. We have digitized information. For decades, our letters have been sent as e-mail, money transferred electronically and photo folders stored at our computers. The concept of a digital guestbook is also not new or one of its kind, as there are existing applications available at least in the App Store and Google Play Store. Added value is in high demand on these applications - some offer to print out a guestbook that is created during the event with an iPad, some offer directions to the place of the event and enable a login from the guest's own device, as seen in Figure 1. These applications offer guest list management and other conveniences for people planning larger parties. Some applications with the word "guestbook" on the title resemble event planner applications more than traditional guestbooks.

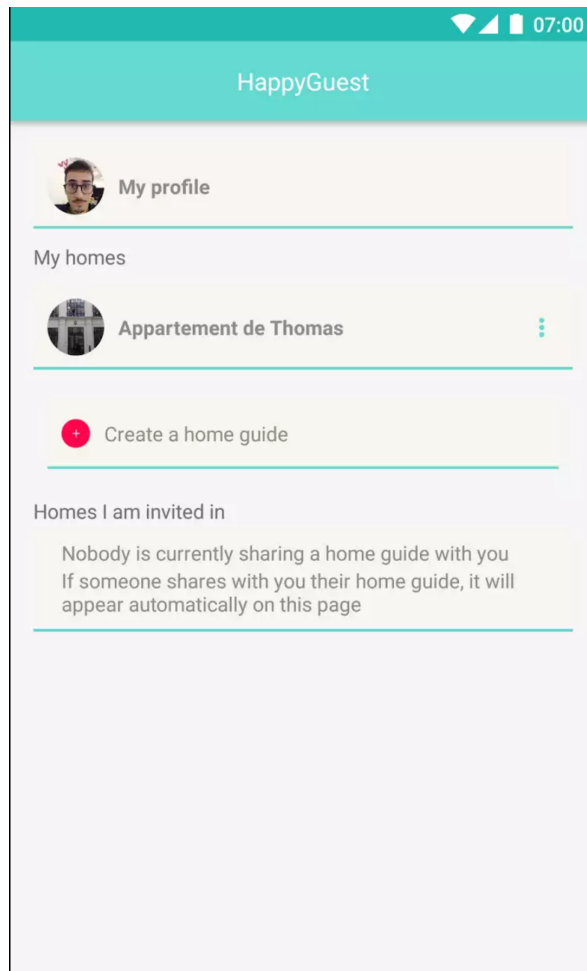


Figure 1. A Screen capture from HappyGuest -application for Android.

These guestbooks base their core design on the concept of the traditional guestbook, but in the end, offer much more. The digital platform itself adds some value by default, such as easy saving and storing of the data and environmental friendliness. These applications, however, are driven by the extra added value of guest lists, features of an event planner and login possibilities. The original concept is there, but as it is still a main feature, it is hardly the key feature that sells the product. These guestbooks are an attraction themselves at the events they are used in. With their added value, they add value to the event.

After the internet became widely available to the public and ordinary people were able to create their own websites, a guestbook as a part of the website quickly became popular (Dominick, 1999). The convention from physical world adapted into the digital one as many other concepts before it. A personal website was seen as a person's own space, which requested a visitor to leave their mark on the page when visiting.

The convention was also transferred to popular social media sites: remember MySpace, the popular social media of the mid-2000's? The website was a collection of personal profiles or "spaces" of individual users and bands. Every profile contained key elements such as photos, friends, a blog and a space for the friends of the profile owner to write their greetings - a guestbook. This space was a list-like element with the writer's profile photo, their nickname and a space to leave their note. This space was commonly used to praise the recipient's page or thank them for adding them to their list of friends. (Thelwall, 2008).

As seen in Figure 2, many modern websites have mostly given up the practice of having a guestbook, but keep the similar kind of communication alive with "contact me" or "feedback" -features. Visiting one's website is no longer an event itself, but a commodity, which has changed the need and style of interaction between the visitor and the website owner.

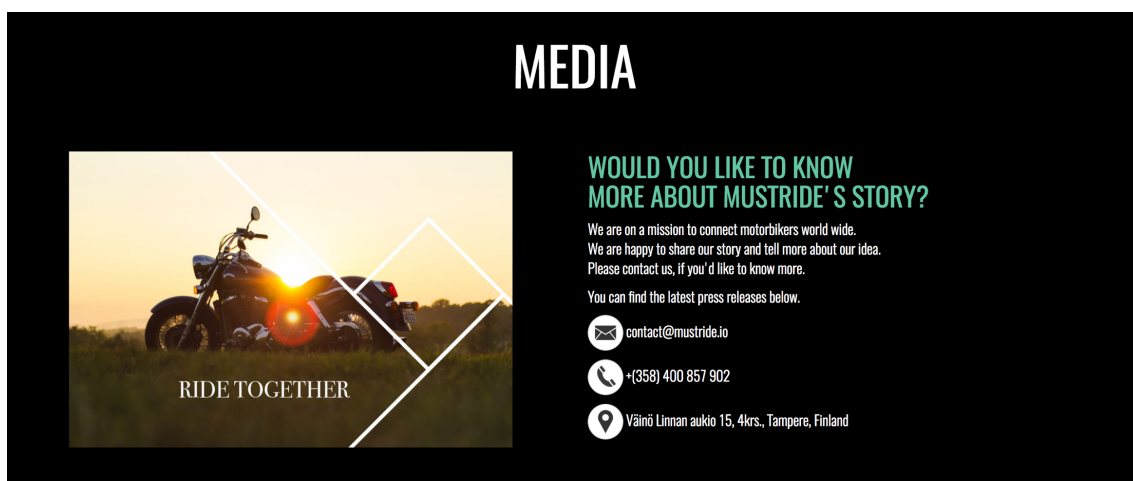


Figure 2. A modern website uses a simple list of contact information instead of a guestbook feature. From <http://mustride.io/media/>.

Board games are another great example of a field that is thriving in the digital environment, providing a lot of possibilities for new features and allowing automatization to replace some of the manual labor. Board games require the players to get together on a certain location, whereas a digital environment allows playing essentially from anywhere in the world. Digitized board games enable a more immersive story with audio and enhanced visuals. Counting points and keeping track of other numerals of the game is automated and what is more, the player cannot lose the little physical pieces of the game. The setup and cleanup of the game vanish in the

digital versions. Liu (2011) writes in his Wired.com article that the digitization of board games should set the player free of all the factors they did not enjoy in a board game to begin with - such as the cleanup and card sorting - and make room for the fun in the game. On the other hand, in some games the physical movements and swiftness with handling the cards is an essential game element.

An interesting attribute in board game digitization is the distinction between a digital game and a digitized board game. Let us imagine a board game with a war theme. The player can summon their troops and invade another country. The attack can be done with bombers or infantry. In a board game version of this game, the player would roll the dice and see how successful their attack was. In the digital board game the dice rolling is digitized and happens with one click or tap or is completely automated and the troops are placed to their new positions by the computer. But why would a player want this from a board game when the digital platform would allow a full 3D-style first person shooter -experience, where they could actually see their troops and act as one of them, leading them to war? Instead of letting the computer roll the dice and decide the next step, why not let the player make their own destiny, reign their troops and be responsible for the winning or losing? This reflects the difficulty of remaking physical products as digital ones: as technology enables endless amounts of possibilities, it is important to know one's user and their needs and wants in order to design a product that uses technology to replicate or enhance the product instead of recreating it in such a way that it is no longer recognizable as the same product.

The board game publishing company Days of Wonder has digitized their hit games *Ticket to Ride* and *Small World*. In an interview with McElroy (2013) from Polygon, the vice president of sales and marketing Mark Kaufmann states that the intent in digitizing these games was never to conquer a new form of business, but to strengthen the existing one by increasing the sales of their physical board games. Even though digitized versions of the board games are a lot cheaper than the physical ones, comparing for example \$9.99 to \$49.99, the problem, according to Kaufmann, is not the price. The digital, easy-to-access games are there to help players learn the rules to the game, and therefore lower the threshold for players to purchase the physical game. And sure enough, when *Small World* was published in the App Store in 2010, the sales of the physical board game tripled. Even after the peak which lasted for three months, the sales did not return to numbers they were before the publishing of the digital version, but

doubled compared to the old sales numbers. Digitization can truly help players learn the rules of the game, and help even the board gaming veterans with the rules with for example extremely broad and complicated rules in many role playing games. Digitalization brings board games to mobile and online for players to enjoy with players on the other side of the globe while sitting on a bus. Digitalization of board games also enables a hybrid between a physical board game and a fully digital version through game boards utilizing some digital elements. The mix of physical and digital aims to bring out the most value in the game with the best user experience.

Kostick (2011) has done research on e-books and their user experience, and found that convention works well for users when designing e-book reading devices. In her paper Kostick reports the findings of three researchers on the topic of digital reading. One of these researchers, Steve Portigal, reports in his study "Reading Ahead" that the user experience of a book starts far earlier than when eyes finally see the text inside the book. When a book is turned into a digital version and read on a reading device, the users are very aware of the physical presence they have lost, but yet possibly unaware of all the potential added value the digital version may have to offer.

The possibilities of new features in e-books are vast. For example, Amazon Kindle enables the user to simply shut down the reader and pick up where they left off when reading later - no need for physical bookmarks. The user can download new books to the device via Internet and pay for them conveniently with their credit card. Highlighting sentences is made easy, and the user receives subtle visual hints of sentences other readers have found interesting and apt. The search function is irreplaceable when using the reader for textbooks. According to Portigal in Kostick's (2014) study, the additive value should be a provocative new feature, but also something that can be turned off and ignored if the user so wishes, as it is in Amazon's Kindle.

Continuing in Kostick's article about e-books, Whitney Quesenbery emphasizes the possibility of multi-format accessibility (2014). Digital devices would enable books to be sold as a combination Quesenbery talks about - when buying a book, the buyer could receive the physical book, a digital copy and an audio book.

No matter how much added value digitization offers, as the physical entity of a book disappears, there is something else that disappears with it - the ability to loan a book, at

least without loaning the whole reading device, which then means losing one's whole bookshelf for the period of the loan. Amazon has tackled the problem more or less successfully with their Kindle e-book reading device (Amazon, 2017). The owner of a book can loan out a book to a friend for up to 14 days. The book is then returned to its original owner. Not every book can be borrowed, though - for many bestsellers, this feature has been disabled. Also, a book can only be loaned one time. The feature somewhat resembles the original book lending concept, but sets too many restrictions to feel authentic. Amazon has also found it difficult to restrain people and businesses from playing the system: There are online services that pair you up with someone who owns a book you want to read in exchange of being willing to loan your own books to other users (BookLending, 2017).

These kinds of services would seem natural and worthy of encouragement with physical books, but for monetary reasons in the digital environment it is just considered bad business. Books are supposed to bring livelihood or at least a fair compensation to the writer who naturally is not willing to give up their piece of writing for free, but what about guestbooks? The motive behind creating a guestbook is not monetary, and neither is the whole content created by a person wanting to turn the guestbook into profit. One could argue guestbooks are crowdsourced; they are created by a large group of people, and meant to be enjoyed by anyone for free. This is something that sets digital guestbooks apart from traditional books turned digital - there is no party that benefits from restricting the free sharing of guestbooks. On the contrary, there are a lot of people who can benefit from the free sharing opportunity. The value of a book is of course often subjective, but even more so in the context of a guestbook - it has no monetary nor resale value.

2.3 Challenges and Opportunities of Digitization

People get attached to objects, but what happens when there is no object to get attached to, only a bunch of data? This is a challenge in the process of transforming products from physical to digital.

People form emotional bonds to objects - according to Kirk & Sellen (2010) this can even be considered a fundamental human trait. The objects might be useless or obsolete in their owner's everyday lives, or they have simply stopped using them or use them

rarely, yet still hold on to the object. This is the case with guestbooks. The objects we store and save can be anything, but what unifies them is the feeling attached to them. The problem with digitalization is that when a product is digitized, the object to attach the sentimental feeling to partly vanishes, and is replaced by a multi-functional object which does not carry the same sentimentality.

Some products are created as new objects, new hardware, that replaces the need for the old non-smart object and creates a new one the emotion can be felt towards. Other products simply use existing technology as their platform or service. A good example of this product group are digitized board games, which are recreated on computers, tablets and mobile phones. Amazon's Kindle is a product somewhere between these two groups - on the other hand, it is a whole new product in its own physical shell, on the other hand, as an e-book reading device, it erases the need for tens and hundreds of physical books.

What if, as said, the digital object is, in the end, merely a bunch of data stored on the hard drive of the device, such as an application and its content? Even though there is an object to hold, store and observe, simply having an object does not guarantee an identical user experience from the emotional standpoint.

This thesis speculates that what people feel towards their mobile phones and tablet computers is only a part of the user experience and the feeling attached to a specific application. According to Thorsteinsson & Page (2014), smartphones do evoke emotion in their owners. A smartphone brand can be a representative of one's personality. Tablet computers and mobile phones are, more than a sum of their parts to their owners, as their user experience is a sum of more parts than just the physical design, the applications installed and the operating system (Thorsteinsson & Page, 2014). As Norman (2005) states in describing objects that arouse positive emotion, "a favorite object is a symbol, setting up a positive frame of mind, a reminder of pleasant memories, or sometimes an expression of one's self". The user experience of important products radiates further than simply to the time frame of using the product.

The user experience of an application is a small part of the user experience of the device. Naturally there are users for whom their mobile phone is a phone used solely for calling, and users for whom their tablet is an e-book reader and nothing else. These

cases are a minority of all cases, as mobile phones and tablet computers these days are designed to be multi-use products.

Lacking the physicality can be a challenge, but the digital essence holds the kind of value impossible to implement in traditional physical products. In these cases, interaction and multimedia are the keywords.

No traditional guestbook can offer the vast amount of different kinds of media that a digital guestbook can, nor can a product without digital features be as interactive as a digital one. Digitality provides possibilities to use photos, images, drawings, audio and video in real time. A traditional book is always used manually - a digital book provides the user the possibility to use a search function to look for parts they especially need instead of browsing through an entire book. A digital book includes its own light source, and is therefore readable in any situation, night or day. On the other hand, of course, a traditional book tends not to run out of battery.

2.4 The Guestbook of the Future

Based on the research on emotion linked to guestbook usage and the research on digitization I formed a group of key questions that are taken into account when designing the methods of the study. Table 1 presents these research questions.

Table 1. The research questions.

#	Question
1	Which factors make a guestbook appealing?
2	Which factors make users feel strongly about a guestbook?
3	How often is a guestbook used and in what kind of situations?
4	How formal is a guestbook considered to be?
5	Which features are vital in providing a good user experience when using a digital guestbook?

The answers to these questions are considered essential to guarantee a successful user experience of the finished product. The questions are the base for the methods chosen to be used in this study.

3 METHODS

The reasoning behind the design method lies in the research questions of this thesis. These methods are aides for understanding the success of traditional guestbooks and examining the ways to replicate these features into a digital product. The key research question is how the user experience changes as the platform changes. As the interview data later shows, the original guestbook holds immense sentimental value in its users. The design methods chosen will attempt to capture the source of this value and insert it to the digital guestbook.

The ISO standard defines user experience as “person's perceptions and responses that result from the use and/or anticipated use of a system, product or service” (ISO, 9241-210:2010). However, Alves, Valente and Nunes (2014) describe user experience as a “fuzzy buzzword”, and state that the ways of measuring user experience vary considerably among researchers on the field. Vermeeren *et al.* (2010) remark that user experience should not only be limited to the time frame of using the product, but include the user's emotions before and after using the product. This is an important difference to note as compared to usability, which is only present when the product is used actively. As Alves, Valente and Nunes (2014) stated, user experience is immensely difficult to measure, as it is such a broad and versatile topic it cannot simply be fully evaluated by ticking boxes in a questionnaire alone.

Instead of the function, content and interaction measured in usability, user experience is measured by subjective, momentary human feelings (Hassenzahl, 2008). Therefore a bad usability does not always translate to a bad user experience, and vice versa. This is not to say usability and user experience are not linked - part of the difficultness of measuring user experience comes from its similarities with usability.

The methods for measuring user experience in this thesis were chosen based on their *ICE score*: evaluation of the method's impact, confidence and ease of implementation. The ICE score evaluates the overall effectiveness of an action and gives a concrete number on the justifiability of said action and a direction on research design (Gerhardt, 2016). The ICE-scoring method has traditionally only been used in a business setting rather than academic research, but the fast scoring mechanism was seen fitting to the

research as the objective was to make the design and evaluation agile. What is more, the end result of the project is a commercial product.

A list of 21 user experience measurement methods gathered by Farrell (2017) was researched and the methods compared using the ICE score. Farrell's list is extremely encompassing. It takes into account four categories of user experience research: discovering, exploring, testing and listening. Before proceeding to the ICE ranking process the methods not applicable to this research were eliminated from the list. Table 2 provides the descriptions for the components of the ICE score. Each criterion is given a score from 1 to 10 and the numbers are summed up. The final number represents the rationality and effectiveness of the action, or in this case, a method.

From the 21 methods, presented in Appendix 1, 9 were accepted in the research based on their ICE score: user interview, requirements and constraints gathering, competitive analysis, persona building, user stories, usability testing, accessibility evaluation, survey, and usability bug review. These methods were seen as effective to execute and their impact was estimated to be high in the end product. Some of these methods play a larger role in the design and evaluation, some are presented more briefly. As an entity, however, they form a versatile group and therefore work well together. The first method used was the competitive analysis found in Chapter 2.2.

Table 2. ICE score explained by Gerhardt (2016).

Impact	If this idea works, will it have a big impact?
Confidence	How confident are you that this idea will work?
Ease	Is this idea something that will be easy to test, or will it take weeks of product development to figure out?

The first step to understanding the user experience of a physical guestbook is a qualitative, half-structured interview, which is why a user interview was executed. The focus group interview studies value, features, user conventions and the overall user experience of the original product, and the opinions and attitudes towards a digital guestbook. The data needed for this kind of research is qualitative. According to Cooper *et al.* (2007), qualitative data can help designers understand the context, domain and constraints of products in ways which quantitative research lacks depth. Qualitative research also makes it easier and faster to understand the behaviors and attitudes of

users. Cooper *et al.* (2007) state that it defeats quantitative research by its capacity to estimate how existing products are used.

The decision to use a qualitative focus group interview was based on the need of data of the wants, needs and opinions of the user. Additionally, a focus group is a useful technique in the beginning of the project, when the emphasis of the study is on the user experience and emotion (Krug, 2006). A survey does have its advantages as the data is highly straightforward, whereas the data from a half-structured interview can be more ambiguous. However, when dealing with sentimental values and emotion, both challenging to measure, a half-structured group interview is justified.

According to Krug (2006) focus group interviews encourage debate and discussion, which are highly beneficial in this study. The group of interviewees, formed by potential users of a physical guestbook, form a diverse group. This can awaken a great amount of conversation that would be absent if the interviewees were to be interviewed separately. The aim to encourage conversation is also the reason behind choosing to carry out a half-structured interview instead of a fully structured one.

Another strength of a focus group interview is that it provides large amounts of information and ideas. As Krug (2006) explains, much of the value of a focus group comes from the group reacting to the ideas and opinions of other group members. Focus groups also work well with capturing the group's feelings and likes about the product. Focus groups produce great data specifically in the very beginning of the project and in this case, as there already is an existing product, the physical guestbook, and opinions are wanted of a new digital version, this approach functions remarkably well.

An interview structure was created based on the questions introduced in Table 1 in Chapter 2.4 The Guestbook of the Future. The interview includes three people representing the present and possible future user groups of a guestbook. Selecting suitable interviewees is fairly simple when it comes to guestbook - the age and sex range of the users of a guestbook is extensive. Three people representing different ages and genders were chosen as a sufficient group to reflect the vast group of people who tend to use guestbooks either as guestbooks owners and creators or guestbook signers.

The interview results provided information for requirements and constraints gathering. Personas and scenarios are created based on the interview results. Miaskiewicz and Kozar (2011) suggest that personas offer various benefits to user interface design. In

their study, they list the five most important benefits of personas: audience focus, product requirement prioritization, audience prioritization, challenge assumptions and prevention of self-referential design. These factors, along with 17 other benefits they list in their article, summarize the need for personas. Designing the product for the right audience with their needs in mind instead of the designer's own is essential for a successful user experience.

Key path scenarios were chosen to compliment the personas and worked as user stories. They are used to describe how a persona tends to interact with the product - they do not simply address use scenarios as tasks, but are more concerned about the user and their goals as a whole. Therefore, using personas and key path scenarios together is beneficial. Using key path scenarios in the early stages of design is also preferable to using for example use cases, which tend to be less detailed on their descriptions of how tasks are presented to a user. (Cooper *et al.*, 2007). These methods and material together composed a suitable bundle of information the design of the product could be based on.

The structure of the user interface is presented with wireframes. Low-fidelity wireframes are a useful tool for early stage design (Hamm, 2014). They provide a chance for expert evaluation and receiving feedback of the content, layout and usability in an early stage of the design. After iteration, the visual design starts with the creation of a moodboard and a style guide. Accessibility evaluation is executed as an expert evaluation at this point of the study.

Even though the purpose of the study is not to test the usability of the product, it is important to make sure there are no major usability problems in the product when user experience testing is made. Usability problems that hinder executing key tasks in the application can affect the user experience in a negative way, which can distort the results. Usability testing was done simultaneously to the user experience evaluation, and found bugs documented in Chapter 5.2.

The user experience evaluation is done with three sets of individual interviews, where an interviewee is first introduced to the topic by being interviewed on their views of the traditional guestbook. They are then introduced to the application and given key tasks to carry out. After the second interview about the digital guestbook, they are given a user experience survey to fill. The survey in question is the UEQ: User Experience Questionnaire by Laugwitz, Held and Schrepp (2008). The questionnaire measures the

attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty of the product with 26 pairs of words or phrases.

The interviews of the evaluation phase are half-structured, as in the design process. The approach of a half-structured interview (Appendix 2) was chosen to encourage interviewees to share their opinions as freely as possible, and was found to be a successful way of gathering diverse data during this research. When it comes to testing new creations, it is always a risk that the interviewees do not share their honest opinions because of the fear of offending the person facilitating the interview, thinking they do not want critique on their products (Krug, 2006). Preparations are made to ensure this does not happen - at the beginning of the user experience testing, the interviewees are verbally encouraged to give critique if they feel like it. Krug (2006) gives some advice on this: it must be made known to the interviewee that feedback and critique is only going to improve the product, and is therefore very useful. The interviews were recorded with the consent of the participants.

Based on the test results and the opinions and suggestions made by the interviewees, the application goes through a final iteration phase. No new major features are implemented at this phase - minor usability issues are fixed and suggestions for future development are documented.

4 DESIGN PROCESS

This chapter contains the main methods used to design and create the application: interview, personas and key path scenarios based on the interview data and analysis. The base of the user interface of the application is presented with wireframes, content specification and interaction design.

The visual design and style of the application is presented with a moodboard, an informal style guide and screens of the application. The implementation is discussed briefly at the end of the chapter.

4.1 Interview

A focus group interview was held to map the user experience of a physical guestbook. The group was interviewed about their experiences of physical guestbooks and views about a possibility of a digital equivalent. As seen in Table 3, three people were interviewed. All interviewees were Finns.

Table 3. Interviewees of the focus group.

gender	age	experience with guestbooks
female	26	does not own a guestbook, uses regularly
female	55	owns a guestbook, uses rarely
male	27	does not own a guestbook, uses often

The interviewees were first briefed into the interview by presenting the topic of the study. The interviewees were reminded that it is not essential to be an active user of the guestbook, but to only be familiar with the concept of it. All interviewees had experience of guestbooks either as a guest user or an owner of a guestbook. Only one of the interviewees had a guestbook of their own at home.

The interviewees reported having used a guestbook mostly at larger family celebrations such as weddings and special birthdays, but it had also been used for smaller events such as small-scale name day celebrations. They reported usually leaving their signature to the guestbook along with some greetings, a short poem, a citation or an aphorism. They remembered seeing drawings in guestbooks, done by both adults and children. There had also been times when the guests had left seemingly informal messages about the events of the day or even the weather in the guestbook. It had also been seen used in non-personal places such as museums, theaters and tourist locations. In these guestbooks it was common for the interviewees to only leave their signature, date and the name of their home town to mark their visit.

Overall the group reported using guestbooks regularly. However, guestbooks were mostly only used during celebrations – meaning the time they were being filled with content. They were hardly ever picked up from the bookcase after the event for merely browsing purposes. This was the case especially if the guestbook in question was used in a particularly unimaginative way, where the book would only consist of a list of names with a title, cause of celebration and the date.

A guestbook was from time to time used also in less formal events, as in evening parties with a larger group of friends, but without an official agenda to the party. This was considerably rarer than using a guestbook in a formal event.

The interviewees were eager to discuss the positives and negatives of a physical guestbook. They felt that even in its simplest form, a book with a list of names in it, a guestbook has informative or sentimental value. When the content is more varied and interesting, such as a guestbook containing photos, poems, drawings and greetings, it increases its value in both informative and sentimental sense. A guestbook also serves as a collective memoir of a shared event, and is best browsed with company.

The ideal guestbook, according to the interviewees, should resemble a guestbook and stand clearly apart from a regular book on its physical outlook. As described, an ideal guestbook also is versatile and highly personal in its content. The messages left in it are especially appreciated if they contain something unique. The interviewees did also appreciate the more ordinary, everyday statements such as a small note of the weather, an amusing incident on the way to the party or a small memory of the day. One interviewee gave an example of a couple arriving to a family meeting with their dog: the

day was particularly rainy, which gave the couple an idea to press the dog's paw to a page of the guestbook in the event, forming a signature from the dog as well as a memory of the rainy, yet enjoyable day of the family gathering.

Anything positive and possibly humorous was considered an advantage. Some effort is also required from the owner to create the perfect guestbook – photos added before or after the event were reported to increase the interest to browse the guestbook also after the event.

When asked about an emotional bond to a guestbook, the interviewees reported they do not usually form much of a bond to a guestbook. One interviewee said they even purposefully avoid forming an emotional bond to physical objects, because it is already difficult for them to throw any physical items away.

To the question about their opinion on an idea of a digital guestbook, the interviewees were unanimous. One interviewee thought it to be a great, potential idea as another reported to not be fond of the idea at all. The third interviewee had an opinion somewhere in between, and agreed to the positive and negative sides to the idea stated by the other two.

The interviewee against the idea of digitization justified their opinion by working with a computer all day and not wanting to use any more technology than what is absolutely necessary during their spare time. They did not see digitization increasing the value of a guestbook. The interviewee also mentioned having a large number of photos stored in their computer, but never browsing them, and thought that the situation would be similar with the digital guestbook. They also added that a traditional physical guestbook is easy to use for older people, who might be the most diligent users of a guestbook as it is now.

One interviewee fully supporting the idea saw many positive sides to the digitized version of a guestbook. They were especially amused by the possibilities of different kinds of digital media usage instead of simple pen to paper -interaction: they stated they would be eager to use audio, photographs and video along with readymade templates. They were eager about the idea of being able to share their guestbooks with their friends and relatives, and liked the idea of being able to print out the book to make it a physical one for the people who do not feel comfortable with technology.

The whole group agreed that a digitized guestbook should include as much elements and features from the physical one as possible. These elements would make the transition from physical to digital easier for the user, even for the older people. Ease of use and simplicity, replicating the physical guestbook, was recognized to be a definite requirement for a successful user experience of the digital product.

As negatives, the interviewees listed the uncertainty of data security, especially if the guestbooks were to be stored in a cloud. They also pondered about the difference of self-censorship and the content of guestbooks. As the traditional guestbook holds a certain appreciation and halo in people's minds, a digital one might be used in a more informal way, since digitizing makes information deletable, and therefore makes the threshold to input any kind of content lower. This, at its worst, according to one of the interviewees, might mean drunken video greetings at an otherwise graceful wedding reception.

One of the interviewees also expressed annoyance about all services being online nowadays. As a result of the discussion, the group summarized that in order to avoid irritation concerning digitization, the digital guestbook should be designed to be extremely easy to use, and particularly the kind of an application that will not require any learning or reading of manuals.

In its entirety, the interviewees were familiar with the concept of a guestbook and used guestbooks regularly. The guestbooks they see mostly contain the dates of the visits and the names of the visitors, and are sometimes accompanied by personal messages or poems. The interviewees regarded these as very positive features. Guestbooks are used in formal and informal events alike, but are rarely browsed in between events. The interviewees did not report feeling strong emotions towards their guestbooks. The opinions regarding a digital guestbook were versatile – some did not like the idea, some were intrigued. The interviewees found both positives and negatives to digitizing a guestbook.

4.2 Core Content Specification

The interview provided plenty of ideas for the product. The interview and the analysis provided information to create some key design principles. Firstly, convention must be followed where it is natural. Convention allows users to use the knowledge they already

have about how objects work and therefore make their tasks easier. As Nielsen (1995) states in his 10 Usability Heuristics for User Interface Design, recognition is better than recall. The application must be self-explanatory to ensure the user does not have to read guides to be able to use the product. Secondly, it is important to add value. According to the interviewees, without the features that the digital environment enables, the digital guestbook is only a copy of the original guestbook, only without the physical presence. The digital guestbook holds potential, and must compensate on the lack of separate physical guestbooks the user grows attached to as the user experience starts before the user has ever seen the content. Thirdly, the user must not be pressured into using all the features the digital guestbook offers. As Portigal states in Kostick's (2011) study, the new features should be provocative, but there should always be an option for the user to take the traditional road.

The name of the product is simply "Guestbook". Guestbook is a mobile application which imitates the physical guestbook and adds some elements that are only possible in a digital environment. The language of the application is English. Some of the ideas for higher level features are not implemented at this time, but are documented in the interview results in Chapter 4.1 to be implemented in the future versions of the product. There are three core functions in the guestbook: creating a guestbook, browsing a guestbook and signing a guestbook. All three core functions are ones that can be found also in a physical guestbook, which makes them essential.

The digital guestbook is event-based. When creating a guestbook, the user inserts five elements: the name of the event, the date, an event photo for the cover of the guestbook, theme for the guestbook and which media they want their guests to be able to use.

When browsing guestbooks, the user can find all their saved guestbooks in "my bookshelf". The bookshelf is a list, and by clicking a list item the user is taken to the book's page, where the user can choose to edit, delete or browse the guestbook.

In the event a user sees a cover of the guestbook and can from there proceed to sign their page. On the empty page they can see the media options: photo, video, audio, text and pencil. The user can choose any of these and when they are ready, finish their signing.

4.3 Personas

The analysis of the interview shows that the digital version of the guestbook is assumed by the interviewees to be used by a larger audience than the original guestbook. The interviewees speculated that the age distribution of the users of the digital guestbook might be larger than that of the physical guestbook. They also believed the application could be used in less formal occasions, and therefore with lower threshold. The interviewees agreed that they would browse their own guestbooks more in between events if it were to be digital and therefore easily shared and accessible from their own device.

These factors were taken into account when designing the three personas, shown in Tables 4, 5 and 6, who represent the target audience of the digital product.

Table 4. Persona: Heli.

Name, Age, Location	Heli, female, 32, Espoo
Story	<p>Heli is a 32-year-old office manager living in suburban Espoo, Finland in a three-bedroom apartment. She graduated with a Bachelor's degree and now works in a medium-sized IT company, where she manages office affairs efficiently using her smartphone, laptop and tablet computer daily. Heli is married and has two children and loves to spend time with the family and relatives. Heli enjoys creativity in her life and appreciates an uncluttered house, efficiency and gadgets that make her life easier.</p> <p>Heli often arranges parties for her kid's birthdays or other special days, and instead of paper invites, she uses digital media to invite loved ones to the celebrations. As someone who uses electronics often, she appreciates usefulness and fastness in the products and rejects an app immediately if she finds it is not easy to use. She is eager to document memories in photos and videos, and uses her smartphone's camera during the parties, but only saves the media in a digital form</p>

	where it's easily accessible, searchable, environmentally friendly and doesn't clutter her home.
Goal	To document memories efficiently, save the environment, be able to share memories
Motto	"Creative technology makes my hectic life easier"

Table 5. Persona: Anne.

Name, Age, Location	Anne, female, 21, Jyväskylä
Story	<p>Anne is a 21-year old nursing student in Jyväskylä, Finland. She was born in a small town, but moved to Jyväskylä for her studies. She enjoys student life to the fullest, has many friends and describes herself as active, joyful, creative and excitable. She owns a smartphone, and uses a tablet computer in her studies to take notes and do her homework. She is not the most skilled with technology, but does well with basic features and enjoys finding new applications to use and isn't afraid to try them out. Anne appreciates fun and relaxing evenings and trips with friends, approachable people and expressing herself.</p> <p>Anne likes to invite friends over to her apartment, which is near the center of the city. She often uses her camera to take pictures of the parties and evening hangouts, and loves to also record video to be able to return to the fun moments during the night with her friends even years after. Anne likes to share the media with her friends and often browses the photos on her tablet computer. She wishes she had a better way to organize her media to form stories.</p>

Goal	To make memories to share with friends, to express herself.
Motto	“My friends love the digital stories I gather”

Table 6. Persona: Pauli.

Name, Age, Location	Pauli, male, 48, Tampere
Story	<p>Pauli lives in a nice suburban Tampere house with his family of six. Pauli and his wife both work full time in office jobs about a 15-minute ride from their home. Their oldest child is 20 and the youngest 11. Pauli is close to his family and always welcomes relatives to visit their family whenever they want to visit Tampere. In addition to this, he is used to arranging celebrations for the children: birthdays, graduations, confirmation parties.</p> <p>During his spare time Pauli likes to watch TV, cook and play sports with his kids. He isn't a tech wizard, but is comfortable around technology and likes to try out applications his children recommend to him from time to time. To Pauli, life is about relaxing and enjoying. He appreciates technology that helps him in his life but also has fun with puzzle games he has downloaded on his tablet computer. Pauli is a social person who likes to make people laugh. He often wonders about how far technology will have come when he'll be the age he'll retire and has a positive outlook on future.</p>
Goal	To enjoy and to be amused, save positive memories of family and friends.
Motto	“I wish there was technology to help me do this faster”

4.4 Scenarios

Key path scenarios were created based on the interview and the list of requirements for features it resulted in. Three key path scenarios were crafted based on the features: Creating a guestbook, Signing the guestbook and Browsing a guestbook. Personas were used in the scenarios to describe typical actions by users.

Table 7. Scenario 1.

Heli: Creates a guestbook
<p>Heli and Antti are getting married in a couple of days, and Heli wants to prepare a guestbook for the wedding. She turns on her tablet computer and opens up the Guestbook application on her home screen. She creates a new guestbook. The starting menu is replaced by a screen where a text guides Heli to insert the name of the event, then the date of the event followed by a cover photo. She then chooses the media she wants her guests to be able to use in the signing of the guestbook: photos, video, audio, text, drawings and stickers. She proceeds from each phase to the next and finally sees a preview of the event’s book cover. Heli has chosen a title, “Heli and Antti’s Wedding” which is shown on the screen. The photo and date are also shown in the preview cover. Heli can move the items to set them however she likes to. The date is shown under the photo, but Heli chooses to move the title, leaving the photo to the bottom of the cover page. She then saves her creation, and sees the cover of the finished guestbook the guests can start filling in. The guestbook is now saved as a draft, and Heli can choose either to proceed to open up the guestbook. As there is still plenty of time before the party, Heli chooses to go back to the main menu.</p>

Table 8. Scenario 2.

Anne: Signs the guest book

A close friend of Anne's is expecting a baby, and the soon-to-be mother's friends have thrown together a baby shower. As the formalities have already taken place and the guests are sitting down and chatting, Anne decides to be the first one to sign the guestbook. She takes the tablet computer from the table, and sees that the application is already open. Instead of a start screen she sees a beautiful guestbook cover with the text "guestbook", the title of the event, the date and an ultrasound photo of the baby. Anne taps the "sign the guestbook"-button on the screen, and she is taken to a page dedicated just for her content. There are multiple icons that represent the media choices. Anne gets the opportunity to choose from five elements: photo, video, audio, text or drawing. Anne wants to add a video greeting along with her signature. She taps on the "video"-button. The tablet computer's native camera application starts for Anne to record her video message. Anne records the video and previews it. She accepts the video and taps the on an icon again, this time choosing "drawing" from the bottom bar. She draws her signature to the page. Anne looks at the page and decides she is now ready with it. She taps the saves her signature and sees a note thanking her for signing, and the application automatically returns to the guestbook cover page.

Table 9. Scenario 3

Pauli: Browses a guestbook

Pauli's sister is visiting his family and is eager to hear how the graduation celebration of the family's oldest son went, as she was unable to attend the party. Pauli decides to show her the guest book entries from the day. He takes out his tablet computer and opens up the guestbook application from the list of applications. From the start screen he chooses "my bookshelf". From the bookshelf he finds a guestbook with the title "Henri's Graduation" and taps it. The guestbook opens and the cover page presents

the title, date and a photo of Henri. Pauli moves to the next page. The page was signed by Henri's best friend, who left a photo and an audio message along with his signature and a smiling face he drew himself. Pauli and his sister listen to the audio message. They turn pages, occasionally stopping to watch video greetings or listen to audio or read poetry and kind words by other guests, until they reach the end of the book. Pauli decides to navigate back to the main menu.

4.5 Defining Style

The first interview provided essential information to build the product brand image and visual style. The most important finding was that the application must always give the first impression of being clear, simple and extremely easy to use. These elements are a good match with clean scandinavian elegance, which was decided to represent the visual style of the product. The design presents a visually simplified style.

Based on the interview results and the personas and key path scenarios created, the application should make its user feel delighted, festive, relaxed and happy. To the user the application presents joyful times with family and loved ones, days well spent and great memories made. To truly replicate the physical, original product, the feeling the digital guestbook should bring its user should also be somewhat nostalgic. The user should hold the guestbook and its contents in high value. Figure 3, the moodboard, creates an example of the ambiance the final product should imitate.



Figure 3. Moodboard.

The most important factors the moodboard is built on are family, parties and good food and drink. Bright colors and relaxed elegance as well as the feeling of summer are inserted to emphasize these factors. The font, *Sacramento*, represents a relaxed yet refined feeling. The color choices highlight the festive atmosphere, nature, and time spent with family. The overall look is clean, simple and elegant with some easy going, casual elements added.

The fonts chosen are Sacramento and Gotham Light Regular. Sacramento, pictured in Figure 4, is used in the logo and titles. Gotham, pictured in Figure 5, is used in all other text. Sacramento is a decorative, festive font that is suitable for bigger and slightly smaller titles, but due to its ornamental nature, is difficult to read in smaller font sizes. This is where Gotham Light Regular comes in. It is a clear, sans-serif font that suits normal text well even in smaller font sizes. In the first iteration of the guestbook application the guest cannot choose their font while signing.

Sacramento

0123456789

abcdefghijklmnopqrstuvwxyzåö

ABCDEFGHIJKLMNOPQRSTUVWXYZÅÖ

Figure 4. Sacramento Font.

Gotham Light Regular

0123456789

abcdefghijklmnopqrstuvwxyzåö

ABCDEFGHIJKLMNOPQRSTUVWXYZÅÖ

Figure 5. Gotham Light Regular Font.

Sacramento, a festive, smooth font, represents the warm feeling of the events the guestbook is used in. Gotham Light Regular is a clean, simple font that is suitable for both formal and informal events. All text in the application is presented in traditional style, where a first letter of the sentence is a uppercase letter. This also applies to buttons. The only exception is the logo, where the word “guestbook” begins with a lowercase letter. In all other text, the name is spelled with an uppercase first letter. Sentences are ended with a period, and no periods are used in titles. The traditional style is consistent and uses known conventions, which makes the overall look pleasing to the eye.

guestbook

Figure 6. The logo of the application.

The logo of the application, seen in Figure X, uses the font Sacramento. It is a simple, fully lowercase text stating “guestbook”. The logo is by default black, and is never used on a dark background. The logo may be used on white background and over the main highlight color of the application, Light Sea Green.



Figure 7. How to use the logo.

The colors of the application are listed in the color palette in Figure X. The light and smooth Gainsboro is used in large surface areas such as backgrounds, where it is used as gradient: the upper color is White Smoke which fades to Gainsboro in the lower part of the screen. Black is used in texts and logos. Gray is used in icons and text.

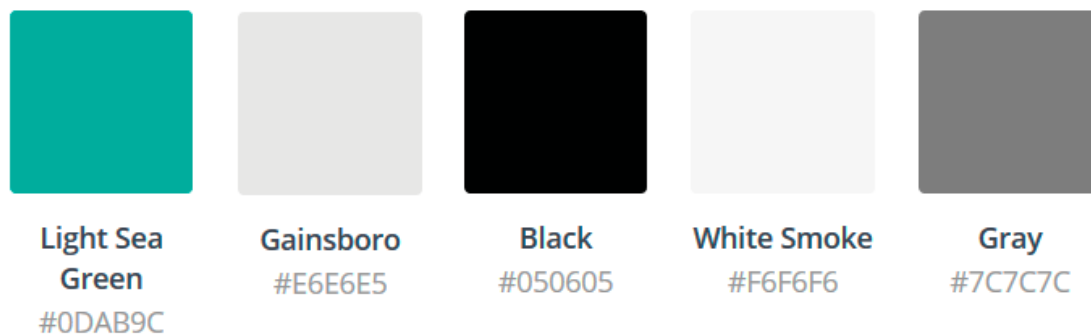


Figure 8. Color palette.

To ensure understandability, the icons used in the application menus are standard Android Lollipop -icons. The icons are a color Gray. The buttons in the application are wide rectangles with rounded corners. Their color is the main highlight color, Light Sea Green. This is also the color of the upper menu bar behind the logo.

To go with the visual style, a warm, personal feeling is transmitted through the texts inside the application. All informative messages the application produces are designed to be personal, welcoming and encouraging, making it clear to the user they are proceeding without trouble and fulfilling their goals. The language used is playful and as humane as possible, making the application seem easily approachable. Krug (2006)

warns designers to be aware of “happy talk” and get rid of it completely. This has been taken into account in the design - even though humane language is used, every sentence contains important information that can be vital to guarantee a good user experience for users who are not familiar with technology. The length of the texts is always kept short, and the maximum amount of sentences is two in each of these messages. No sentence is redundant as they always serve a purpose - the least as a double instance of a piece of information if nothing else.

The guest can create their own art freely when signing the guestbook. Some restrictions exist: only certain fonts and colors are provided. The length of a video and audio clips is also restricted to one minute. This is a style choice as well as a matter of practicality. The length of one minute is designed to ensure that the idea of short, compact messages from the original, physical guestbook is transferred to the digital one. As an extra, taking practicalities into account, this also keeps the file sizes low - large file sizes and a limited amount of memory in a tablet computer could make the user experience unpleasant for the owner of the tablet computer.

4.6 Wireframing

The wireframing was done as soon as the needed concept design had been completed. The personas and key path scenarios were used as a base for the wireframes. The wireframes present the minimum viable product. As can be seen in Figure 9, the wireframes for the start screen and the bookshelf screen are extremely simple, providing only the basics. The visual design creates a more graphic and complex appearance, but even then, the simplicity of the content remains. The wireframes for all screens are presented in Appendix 3: Wireframes.

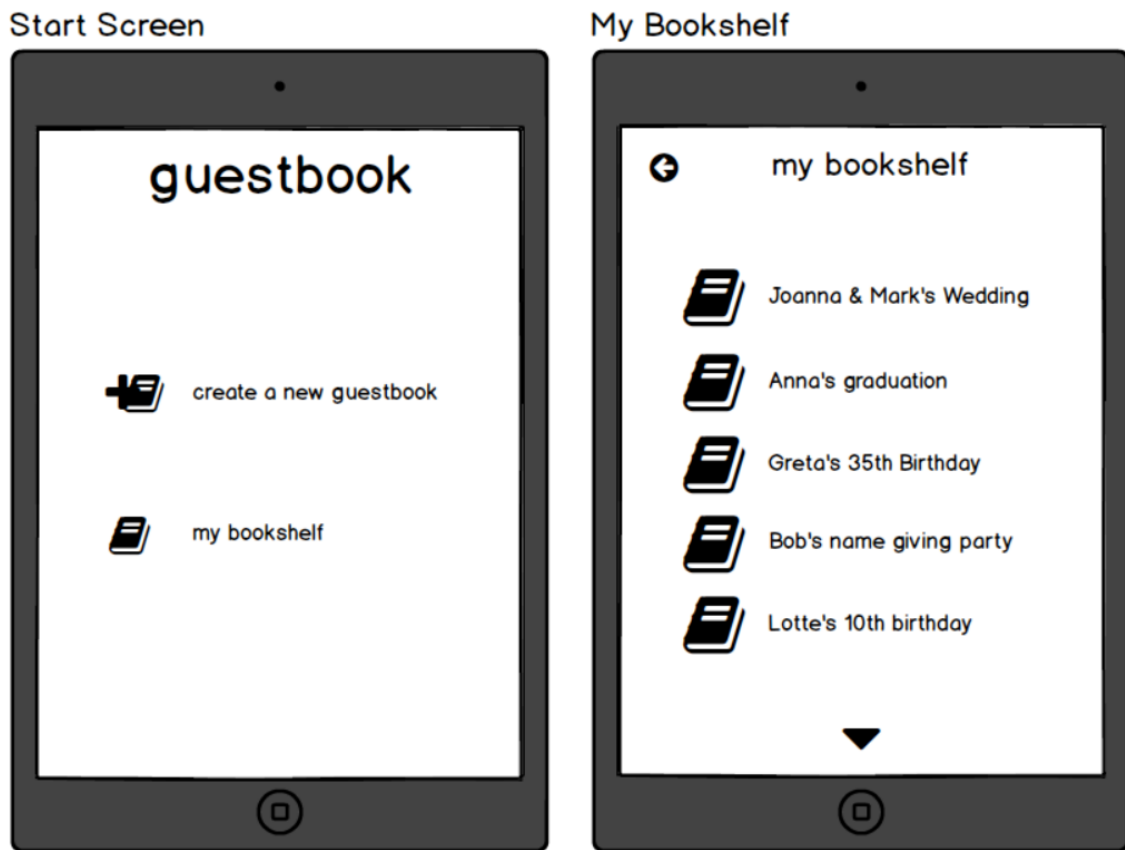


Figure 9. Wireframes of the application: Start screen and “My Bookshelf”.

The wireframes were used to gather quick feedback of the progress of the design process. A usability test with a paper prototype was conducted on one person. The tester was shown printed photos of the wireframes, and asked to complete three tasks, as shown in Table 9. The three tasks represent the three core features of the product. In addition to the tasks, the tester was briefly interviewed about their thoughts on the application.

Table 9. Tasks in wireframe usability testing.

#	Core feature tested	Task
1	Creating a guestbook	Create a guestbook for an event and save it to be used later.
2	Browsing a guestbook	Find a guestbook called “Joanna & Mark’s Wedding” and browse it.
3	Signing a guestbook	Sign the guestbook using at least two different media.

Although the tester was able to perform the given tasks quickly, the testing brought numerous small problems into attention. Two screens were missing vital navigation icons, and the purpose of some icons was left unclear to the tester. As a result of the test, navigation buttons such as left arrows and checkmarks were added where needed. When interviewed, the tester expressed a fatigue when reading too much text. Thus, the info texts were shortened to absolute minimum.

4.7 Interaction Design

The features of the guestbook were determined based on the results of the first interview. The opinions and suggestions made by the interviewees were taken into account. The features included in the minimum viable product are discussed later in this chapter.

The key word in the design is convention. As Krug (2006) explains, plenty of web design conventions are derived from magazines and newspapers. Well-working conventions are only outdone by extraordinarily good new design ideas, since familiarity and decreasing the cognitive load is the strong point of convention even in designs that are not the best, but are widely used. As newspaper conventions transfer to web pages, it is natural to use these web conventions on mobile design.

Another factor considered a key theme in the design is simplicity. The final product may be filled with complicated features, such as editing guestbook themes in a detailed manner, adding new media to guestbook and sharing guestbooks. Especially then, it is important to keep the design simple and free of unnecessary noise. Visual noise wears a user down and makes it more difficult for them to recognize the relevant information from a screen (Krug, 2006).

As can be seen in Figure 10, the main elements of the application are browsing guestbooks, creating a new guestbook and signing a guestbook. Browsing a guestbook is implemented in such a way that the user experience is similar to browsing a physical book. This is created visually - an open guestbook actually looks like a book in the screen and has animations for turning pages.

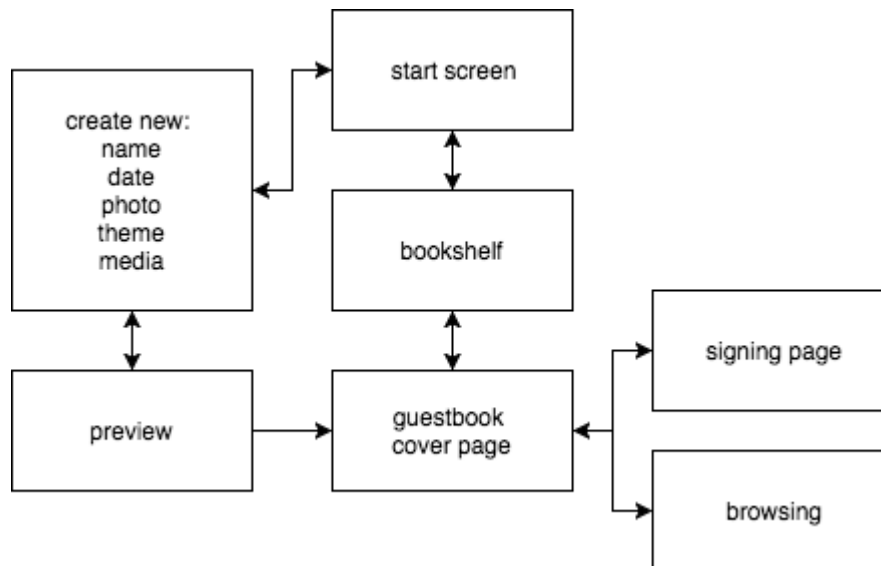


Figure 10. Interaction diagram.

As seen in Figure 11, the opening screen only has few elements. Under the title, it holds a space for two buttons - one for creating a new guestbook and one for browsing existing ones. The opening screen is very simple, and does not let the user make any mistakes by its simplicity.

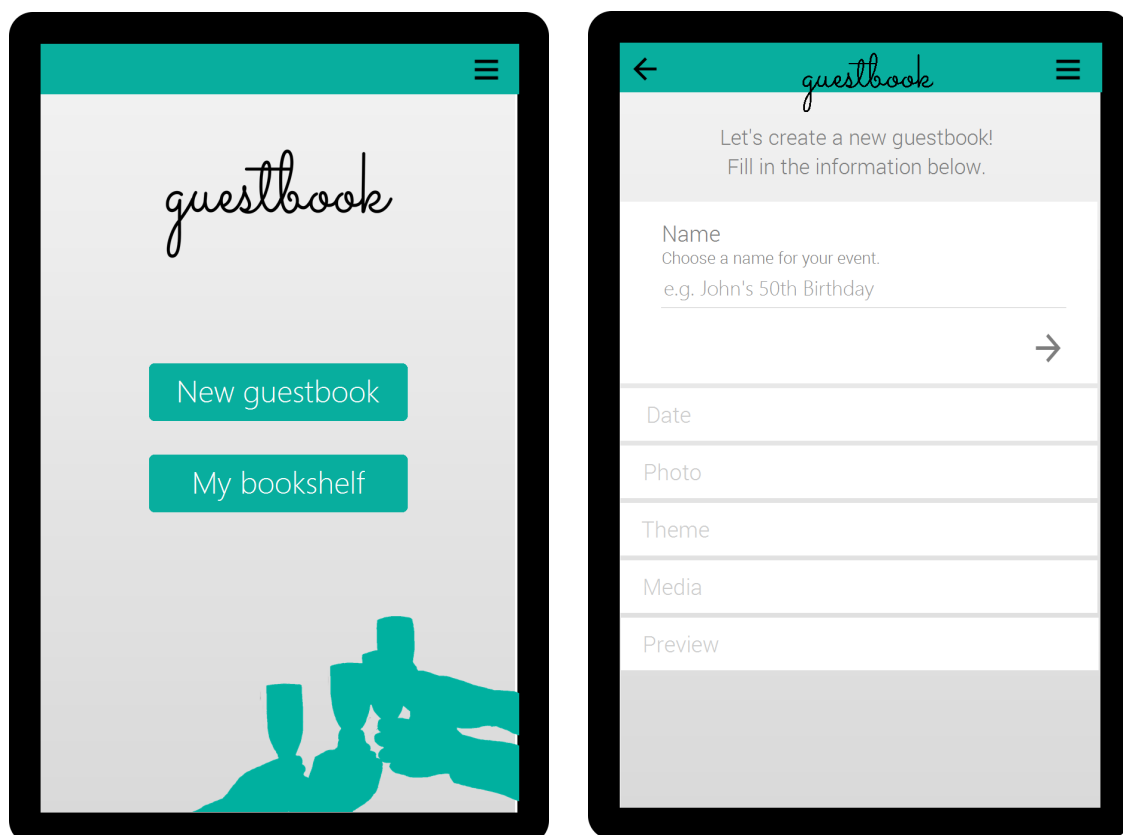


Figure 11. Prototype images for application: start screen and guestbook creation screen.

Tapping the button to create a guestbook guides the user through a creation process. The creation of a new guest book is a half guided feature, where the creation is made as easy as possible to the user. The user is taken to a screen where they are greeted with some warm words, and under the short guidance they can see the steps they have to take to create a guestbook. The titles of these steps are Name, Date, Photo, Theme, Media and Preview. The box containing the first step, Name, is open by default. Inside the box, the user can see a title, “name”, a short description of their task, “What is the name of the event?” and a text input field for the name. When a name has been inserted, the arrow icon which takes the user to the next step activates. The process is straightforward - it provides the user with actions they must perform before continuing to the next step.

The user receives short guidance during every step - for example, as in the first step with the name, the user is guided to choose a theme for the guestbook with the title “Theme” and a short text describing the action: “Choose a theme for your event”. When the user is choosing the media they want their guests to be able to use in this specific guestbook, along with the title “Media”, they see a text “Which media do want your guests to use?”. A user who likes the traditional, simplistic style may choose for example solely text and photos, as a contemporary user in a less traditional setting may use all of them, or for example only video for a certain kind of event. The input is made as easy and self-explanatory as possible. The user never has to think about correct way of input in text, date, and other selections.

The main design principle behind guestbook creation was to make the user a part of a straightforward, easy-to-follow storyline. As said, making mistakes is designed to be impossible for the user. Krug (2006) explains the problem of scale and perceiving size in web: unlike in a department store in the real world, as users it is sometimes difficult to present even a rough estimate of the scale and size of the webpage we are using. It is therefore important to show the user that progress is being made and that the goal is not far. (Krug, 2006). The storyline makes it easier for the user to perceive their progress and be sure that they are moving to a right direction. The objective is to design such a clear storyline for the user that it makes it impossible to make mistakes. In case mistakes happen, the user receives useful information on how to proceed.

After successfully making all the choices, the user sees a preview of the guestbook cover. They are advised to drag and drop elements wherever they look the nicest to their eye, and given the option to go back to edit the guestbook once more or save the

guestbook as it is. After saving, the guestbook cover will appear on the screen, and a pop-up box informing the user the guestbook is now ready will appear. The user can then choose to start the party right away or wait until later and only choose to save the guestbook at this time.

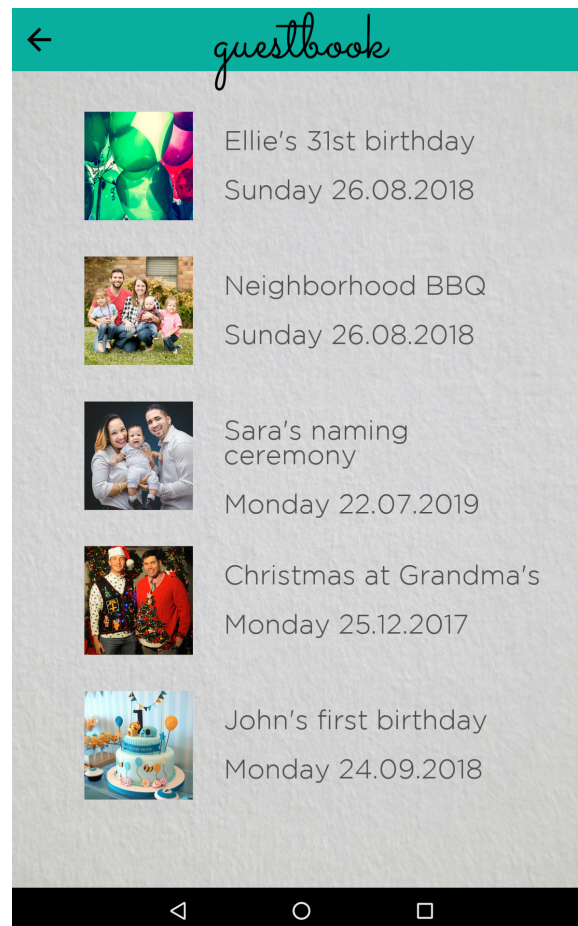


Figure 12. The bookshelf.

As seen on Figure 12, when the user taps on the button titled “my bookshelf” on the start screen, a screen with a list of their guestbooks will appear. The list has a title, date and a small photo of the cover page of the book next to it. A guestbook in a bookshelf can be selected by tapping it. In case there are more books on the shelf than what can be visually presented on one page, there is a caret at the bottom of the screen, and more guestbooks can be seen either by swiping up or by tapping the caret. A search feature will be added in future versions. This is because eventually the number of guestbooks in

the library will be large. Nielsen (1997) states there is a group of users for whom search is the main navigation system in the web, as some users prefer to navigate the site through links. Krug (2006) explains the phenomenon appears in the same form in the real world - some people, when entering a store, are straight away determined to find a salesperson to help them find what they are looking for, as other people trust the department signs hanging from the ceiling trying to find what they are looking for.

When the guest decides to sign the guestbook, a new, empty page is created for them. On the bottom of the screen there is a bar which shows all the media that can be used in a particular guestbook. As seen in Figure 13 the user can add media to the screen by tapping the icons. Any media can be deleted in a drag-and-drop -style by selecting an element by placing a finger over it and dragging it to the trash can that will appear in the upper part of the screen. The user can stop editing at any time - if they want to cancel signing, they can tap an arrow icon on the upper left corner of the screen. When they are ready with creating their page on the guestbook, they can tap on the ready-icon on the upper right corner of the screen. They are then taken to the cover page of the guestbook. Each guest has one page dedicated to their use in the guestbook - guests can sign them either individually or share a page with their family or companion.



Figure 13. A blank signature page.

The design was made around the principle that was heavily emphasized by the group interview attendees: not having to read a manual to be able to use the application. The application strives to make failing impossible for the user with its simplistic, straightforward design. Another way of making the application easy to use was to copy as many features from the physical product as possible. This was put into practice with for example page turning similar to a physical book.

It is always difficult to find the balance between the number of clicks to get where the user wants to be and the amount of information on a page. On the other hand, the designer wants to keep the amount of clicks as low as possible. This increases the pressure to include more information, links and elements to a single screen. Krug (2006) states that even though minimizing the number of clicks is a widely known convention and functional criteria, it is more than acceptable to compromise at times. In the end, what really matters is that the user proceeds with ease with whatever their task is. It is more important to make their path visually clear and therefore easily understood and

fast rather than trim out a few clicks in the expense of making the path slower. What is important is that despite the clicks and changing screens, the user knows they are on the right track (Krug, 2006).

One of the design principles to go with the simplicity mentioned earlier is making everything self-explanatory. As discussed earlier, the main wish of the interviewees was that there would be no need for reading a manual or copious amount of instructions. Users are not patient or willing to read instructions. Users are impatient and they want results. Most of the time, users will only stop and read instructions after several attempts of trying and failing. Even when users do read instructions after some unsuccessful attempts, they rarely read them from beginning to end, ultimately finding what they are looking for (Krug, 2006).

4.8 Implementation

Corona software development kit was used for the implementation of the application. Corona SDK is a development environment which uses integrated Lua on top of C++ and enables the development of graphical mobile applications. The libraries and modules used in the implementation were provided by Corona labs.

The application was developed for Google Android tablet computers, and used with a ASUS Google Nexus 7 Android tablet with an Android version 6.0.1. Corona allows easy optimization for other platforms such as iOS, but to ensure optimal performance in testing environment, Android was chosen to be the main and only platform at the time being. The application also works on mobile phone devices, but is designed to mainly be used with tablet computers. To avoid security issues, the testing version saves all data locally to a user's own tablet computer.

5 EVALUATION PROCESS

This chapter describes the evaluation process of the digital guestbook that was designed and implemented according to user needs. The interviewees from Chapter 4.1 were selected to evaluate the finished first version of the product, and were given a chance to see their own ideas implemented in a product. The evaluation process consists of four parts. This chapter also presents the revisions on the product to be made based on the evaluation.

5.1 Methods of Evaluation

To evaluate the user experience of the digital guestbook, three participants of the first interview shown in Table 10, evaluated the user experience of the product in a four-part process. According to Krug (2006), for the first round of testing, three testers are enough. Although Krug speaks of usability testing, his statement is applied here also to the first round of user experience testing along with the usability testing.

The evaluation examined attitudes and values rather than the behavior of the participants. The purpose of the evaluation was to find out what kind of emotions and what kind of an experience the guestbook awakens in its users. Usability issues were also noted during the evaluation and taken into account by a form to be filled in by the participants in the fourth part of the process.

Individual evaluation sessions took about 45 minutes. The sessions were held at quiet and calm locations: in two occasions in the homes of the participants, and in one occasion, in a coffee shop with few other customers. The audio of the sessions was recorded, and the participants signed a consent form for this. The screen of the tablet computer was not recorded, but only observed while the participants were using the device. The participants were advised to think out loud while using the application, and were given instructions and a brief example for the matter.

Table 10. The participants.

gender	age	experience with digital guestbooks prior to evaluation
female	26	none
female	56	none
male	28	none

The participants were briefed into the evaluation process by presenting the topic of the study, and by reminding them that the object of the evaluation was the product instead of the participant. All participants were familiar with the concept of a guestbook, and had experience of using them either as the owner of the guestbook or as a guest user. One of the interviewees owned a guestbook themselves.

The first part of the evaluation process resembled the first interview conducted in the beginning of the product design process. The participants were asked about their relationship, experiences and emotions towards the traditional, physical guestbook. These questions partly overlapped with the first interview done in the first phase of the design process of the application, and the reason behind asking these questions was to revive the participants thoughts about their usage, opinions and feelings towards the traditional guestbook. It was considered a necessity to awaken these memories and feelings in the tester to ensure the collected data is relevant. This step was needed to steer the minds of the participants into the concept and remind them of their views about the traditional guestbook, in order for them to be able to carefully evaluate and compare their experiences with the digital counterpart.

In the second part of the evaluation, the participants were given basic tasks to execute with the digital guestbook. The testers were handed an ASUS Google Nexus 7 Android tablet with the guestbook application open. There were three tasks, one for each of the main use cases of the product: firstly, create a guestbook for an imaginary event or an event coming up in the future, secondly, open the guestbook and sign it as a guest, and thirdly, browse the guestbook.

After executing these tasks with the guestbook application, in the third phase of the process, the participants were interviewed about their views, emotions and experience of the digital guestbook and about their possible other experiences with digital guestbooks. The fourth part for the participants, who are presented in Table 10, was to fill out a form about their experience with the application to a form containing adjectives and descriptive words in pairs with their opposite meanings. The purpose of this was to distinguish between problems with usability and the user experience.

The last phase, the User Experience Questionnaire developed by Laugwitz et al. (2008) was used for gathering data about the user experience. The questionnaire has 26 pairs of adjectives describing the user experience. Every pair represents each other's opposites, as in "inventive" and "conventional" or "unlikeable" and "pleasing". As can be seen in Figure 14, in between these descriptive words there are seven slots for the participant to use as a checkbox. The user marks the slot that best describes their opinion of the product. The participants were instructed not to spend too much time thinking, and use their intuition while filling out the questionnaire. Because all the participants were native Finnish speakers and the nuances of the wordings can be subtle, the questionnaire was translated to Finnish. The English and Finnish versions of the questionnaire can be found in Appendix 6.

easy to learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	difficult to learn
valuable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	inferior
boring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	exciting

Figure 14. Example of rows in the user experience questionnaire.

The toolkit of the user experience questionnaire (available at <http://www.ueq-online.org/>) provides a data analysis file, which categorizes the results in five scales: attractiveness, perspicuity, efficiency, dependability, stimulation and novelty.

5.2 Pre-test Interview

The opinions of the participants regarding the traditional guestbook replicated their opinions during the first phase interviews. They reported using a guestbook in larger

family celebrations as well as in smaller get together with friends and family. They usually left a signature with a possible poem, citation or drawings.

The participants were also asked about their views on the ideal guestbook and thoughts about the factors that make a guestbook compelling and on the other hand, aversive to use. Unique guestbooks which required work and effort from both the owner and the guests were considered the best kind of guestbooks, as plain and boring text-only guestbooks were seen as the most undesirable to use. The participants also reported, as in the first interview, that they do not, or try not to, form an emotional bond with a guestbook. Guestbooks are, however, something they would not throw away even if they were not to use them.

5.3 Tasks and the Digital Guestbook

With their hopes and views of the physical guestbook freshly in mind, the participants were handed the digital guestbook, running on an Android tablet computer. As mentioned, they were given three tasks to perform using the application: create a guestbook, sign a guestbook and browse it.

The tasks were chosen to represent the key user cases of a guestbook. These use cases are also present in the physical guestbook, which makes it easier for participants to compare the two versions. The participants were able to complete the tasks without outstanding problems. In few cases the participant encountered a bug, and in these cases the participant was informed and instructed a way around the bug.

A separate usability evaluation was not made – instead, the actions of the users and the thoughts reported out loud was observed while they used the digital guestbook. Several small usability problems were documented based on the actions and thoughts of the participants during the evaluation process. The problems were both usability problems and small bugs, both of which are documented in Table 11. These issues are to be fixed to ensure better usability and overall user experience.

Table 11. Usability problems and bugs.

type	problem	solution
usability problem	User does not recognize buttons and therefore does not tap them.	Change visual style of buttons to resemble more traditional buttons to enable recognition.
usability problem	User tries to delete example text in text field for event name.	Delete example text when text field is active.
usability problem	User tries to proceed without choosing media or a theme.	Make the first theme a default theme. Mark all media as chosen as a default.
usability problem	User tries to click on the date instead of the “Change date” -button when choosing the date	Combine date and the button for choosing the date.
bug	While moving a photo while making a signature, the move-icon moves but the photo does not.	Fix bug - icon should always follow photo.
bug	Keyboard does not always disappear when user has finished writing.	Fix bug - keyboard should always disappear after user is done with writing.

5.4 Post-test Interview and Results

None of the participants had used a digital guestbook before or heard of one being available for download. The first experience with the digital guestbook was versatile - they described feelings of confusion as well as excitement for something they had not experienced before.

The participants did report many positive sides to the digitization, which they vocalized both during the use of the product and the post-test interview. The feature all participants commented on was the amount of different media that can be used in signing the guestbook. This was seen as something that increases creativity, awakens positive emotions and adds character to the signatures as well as makes them more

personal. One participant reported being immediately eager to see what their party guests would come up with when given the possibility to use a digital guestbook.

The participants felt excited about the vast amount of possibilities the media provides them with. Another participant also played with the thought of a signature in a guestbook being a group effort: a family or an entourage in a wedding, for example, could take a group photo and only sign one page of the guestbook as a family. This would also provide everyone in the group the possibility of being involved in the guestbook even if one would not feel confident using technology themselves.

The way digitization disrupts the traditional usage pattern of guestbooks was seen as a positive change which allows more creativeness. One participant was excited about an idea of providing a guestbook as a gift for the host of the party. The digital context was also seen as an advantage when it comes to spontaneity: the participants speculated that the possibilities could evoke spontaneity in the guests, thus providing better, more interesting and personal content for the guestbook.

One participant pointed out that a tablet computer or a phone are used more often than a physical guestbook because the digital appliances have other uses than serving as a guestbook. Therefore, a digital guestbook could be possibly browsed and used more often, as it is simply present more often. This is of course dependent on the digital habits of the user; for example, one participant reported never browsing digital photos on their computer - another reported often spending time browsing photos from events.

The number of media also ensure that every guest can use the media they are comfortable with - not everyone is talented with written words which is a requirement if one wishes to provide quality content for a traditional guestbook.

The participants also described negative feelings towards the digital guestbook. During the testing of the product, as part of thinking out loud, the participants reported experiencing feelings of confusion about what they should do next to achieve their goals. Later during the interview the participants reported that the first time using the product was definitely more difficult than using a physical guestbook. Some participants thought it was natural for the first time use to be somewhat slower and more confusing than the times one has already used the product multiple times, but stressed that if they were to use the digital guestbook, even the first time of using it should be as

easy and straightforward as possible. The product must be very easy and intuitive to use.

Other negative feelings concerned usability issues and doubts about the use cases the participants imagined for the product. One participant described their feeling after the tasks as confused and not being sure whether they had been very successful in using the application. Another participant pointed out that filling in text to an application, even though meant as a warm greeting to a person they are close with, felt somewhat like filling up a web form. The participant also pointed out that it was difficult for them to imagine a guestbook being anything other than a physical book. This is one of the reasons they felt the context fitted one where a user would fill up a web form rather than write a personal note to a valued possession.

The doubtful theme all participants mentioned was older people as a user group. The participants were skeptical that a digital guestbook could ever be as easy to use that even older people who do not use a computer or smart phones could be able to use it. The level of willingness to adapt to a new way of using a guestbook could also be low among this demographic. The lack of willingness to use the product was not the only matter worrying the participants about the elderly - they also speculated that an older person might not want to ask for help with technology because they might think it is embarrassing not to know how to use new devices. This might not only be the case when talking about the elderly, as it is also normal for, for example, a middle-aged person not to want to use technology in fear of not knowing how to. A video tutorial would not solve the problem - only a fraction of guests would watch it in noisy parties even if it was informative. The threshold to start using the product must be tailored to be as low as possible.

The digital version may eliminate some user groups, yet enable other groups to learn new: the participants shared thoughts about a guestbook being a safe, familiar object to practice using digital products. The functionality and affordances of a guestbook are known to all, and it might be easier for someone not very familiar to technology to start using it with a product they, in theory, have prior knowledge of.

An interesting note a participant made was that with the digital guestbook, the line between a guestbook and a photo album fades. This is a fair point, as in addition to traditional physical photo albums, people are accustomed to digital photo albums as

well, and it is understandable to see similarities in between a digital guestbook and a digital photo album.

The participants were full of ideas regarding extra features, such as stickers and GIF-files that can be attached to the signature page. One participant suggested it would be a nice addition to be able to add a “day after” -page: a page that the host of the party could fill in the day after the party to describe the event and its atmosphere. Another participant was enthusiastic about the idea of being able to project pages of the guestbook to a wall during the party. This would no doubt also be an answer to the question of how to present a digital guestbook at a party in a way that the guests understand the tablet computer serves as a guestbook.

Other participants wished for protection against some guests - particularly ones that are intoxicated. The drunken guests who are handed a digital guestbook with multiple media choices at a party were seen as a threat to the integrity of the concept of a guestbook. Other kinds of protection were also desired. The participants liked the guestbook as a platform to share personal and close messages, but were worried about the amount of people that are going to see their messages, since a digital guestbook is much more easily shared than its physical counterpart. Information security and sharing did provoke a lot of comments from the participants. They did first enjoy the idea of being able to share their guestbooks, but after some thought, felt somewhat suspicious about it. They felt the feature would allow too much sharing, taking into account the amount of information, especially emotional content. However, the participants would like to be able to access their guestbooks from other devices and store them in the cloud to be sure the saved books are safe - sharing to themselves, so to say. This would also solve the problem of the saved books taking a lot of space from the guestbook owner's own device. One participant was feeling positive about sharing the guestbooks, but was not certain they would remember to do so after a party or put any energy into it.

When thinking about the party occasion, the participants were somewhat worried about the weaker qualities of digital products: they felt a digital device can never be trusted a 100 per cent in these important occasions. The device can always be out of battery or it may not even start. Another risky aspect to having a digital guestbook is the fact that the platform, the tablet computer itself, can be rather valuable. A lone tablet computer lying on the table in a large party can be a tempting factor for some guests. Of course, as the participants notified, one would always hope to only invite trustworthy guests to their

parties. There is a risk, however, if outside people have access to the party space, such as in weddings celebrated in hotel event halls.

The participants saw the digital guestbook to be more fitting to events where the guests are younger and the party is more casual. They would decide on which one to use based on the guests, and some occasions such as weddings could even have both, the physical and the digital guestbook. The guests could then choose themselves which one to use.

The opinions on the amount of using the digital guestbook were unanimous. One participant was doubtful they would use or browse a digital guestbook any more than they browse a physical one. Another participant considered a digital guestbook considerably easier to access in everyday life, and therefore imagined they would browse and use it more than a physical one. The participants were asked about their habits of browsing photos on their devices, and the answers correlated with their estimations on how much they would browse a digital guestbook. This refers to the factor depending heavily on one's personality and habits rather than the guestbook itself.

Another difference between a digital and a physical guestbook according to the participants was the affordance. The traditional guestbook is a well-known concept and when a book is seen open on a table in a party, the guests are very aware of its function once they see it. This is not the case with a digital guestbook, since a lone tablet computer on a table does not provide the context needed for the guests to immediately guess its purpose.

Overall the participants reported they could see themselves using a digital guestbook in the future. They would not, however, completely abandon the traditional guestbook, since they felt the traditional guestbook serves well in more official events and in public places such as museums. The physical guestbook was considered to be more sophisticated and composed. In some events, such as funerals, using technology might even be considered impolite. The digital version was seen as a product for younger adults and hi-fi enthusiasts. Not all official events were considered to be too official for a digital product - for example one participant ideated that a digital guestbook could be used in official events such as a 20-year anniversary of a large company. The media guests are able to add could be limited to more official ones such as text, and official photos added later by the company, not by the guests.

5.5 Questionnaire Analysis

According to Laugwitz, Held and Schrepp (2008) a score of 1.5 in the User Experience Questionnaire can be considered “a quite good score”. As values between -0.8 and 0.8 are considered a neutral finding and values over 0.8 a positive finding, a look at Figure 15 tells the overall user experience for the participants was positive. All scales scored over 0, which is itself a somewhat positive finding regarding the user experience.

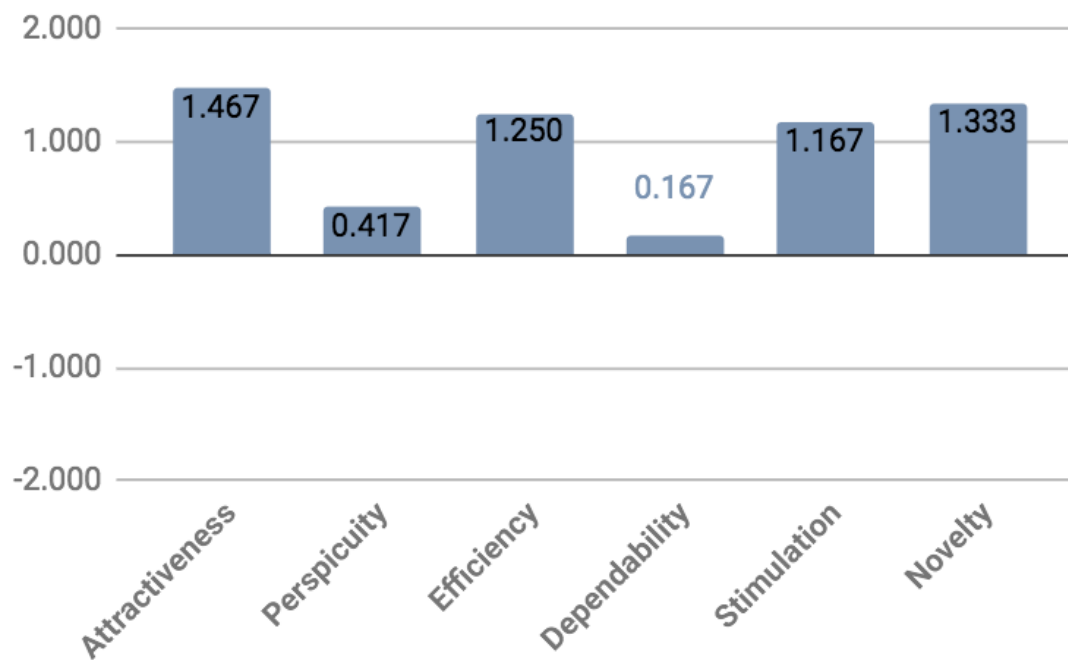


Figure 15. The scales and the result of their success in the user experience questionnaire.

Attractiveness scored the best with a score of almost 1.5. This is a sign of the visual style of the application being successful. On the other hand, perspicuity with a score of 0.417 did not perform well. The product was not seen as consistent, easily learnable or extremely easy to use.

Novelty with a score of 1.333 and stimulation with a score of 1.167 represent the interview results well - the participants did report being excited and interested about the new media possibilities. Dependability performed worst out of the five scales with a score of 0.167, which means the participants did not see the application as easily predictable or secure. This can also be seen in the interview results, as the participants

had doubts about sharing and learnability of the product. The participants reported uncertainty and confusion about performing the tasks with the guestbook. Because of this, the good score of efficiency, 1.250, can even be seen as surprising. On the other hand, with a written questionnaire semantics plays a large role. The participants can interpret efficiency in different ways, and they did, for example, report that the application worked fast and reliably.

6 DISCUSSION

Content is what makes a guestbook. During the interviews about both, the physical and the digital guestbook, the participants made it clear that a guestbook exists through its content. The better and more versatile the content, the better the guestbook. The participants did not report feeling strongly about the guestbooks in their lives, but did express feelings of sentimentality connected to them. Even if a guestbook was not used, it was never thrown away. According to the participants the guestbook was considered to be something delicate, elegant, warm, traditional and respected, and in some cases quite formal, as the digital version was seen more as spontaneous, fun, unofficial and creative. This was most evident when the participants expressed worry about intoxicated guests providing non-suitable content to guestbooks in celebrations that should be respected. Based on the thoughts expressed by the participants, it can be said that even the simplest form of guestbook has some sentimental value. Content is what makes a guestbook appealing, and it is the aspect that makes users feel strongly about a guestbook.

There are many kinds of guestbook users - some use guestbook every time someone visits them, some only use guestbooks in very formal occasions such as weddings or religious events, some only use guestbooks occasionally in museums or other public places. The formality of a guestbook depends on its owner and its user, but a physical guestbook is considered to be somewhat sacred and respected despite using it in a very relaxed way and in informal setting. The user experience provided by the guestbook is mainly dependent on the content and ease. The affordance of a guestbook is known to Finnish culture, and an open book placed in a strategic place in a party is easy to recognize as a guestbook. The guestbook must feel familiar and easy to use. As said, the content makes the guestbook and provides great memories and experiences for those who own the guestbook and those who read it. The content can be emotional and intimate itself, and even a fairly simplistic message in a guestbook evokes emotion in the form of memories.

During the evaluation of the digital guestbook, the participants were surprisingly reticent about how they felt about the lack of an actual physical book. One participant briefly brought it up - they stated that they felt somewhat odd not to be holding an

actual book in their hands while making the signature. Otherwise, concerning the physicality, the participants were only concerned about the problem of the many affordances of a tablet computer compared to an open book lying on the table in a party. The tablet computer is not necessarily instantly recognized as a guestbook. The problem of the lack of the physical book was expected to be a broader issue among the participants. As this can be something a simple redesign may have an immense effect on, it is suggested to only draw conclusions after further iteration and study of the product. It is also a possibility that the more tablet computers and other digital devices are used in the future, the less the users miss the actual physicality of a book. Overall the participants were excited about the new features enabled by technology, but doubtful of its ability to completely replace the traditional guestbook especially within older generations. They did not think a digital guestbook will completely replace the physical one for some time, and thought that both the guestbooks were useful in different kinds of occasions.

In the light of the study, the emotional attachment to a guestbook is attached to the content of the guestbook rather than the physical entity. Therefore, the emotional attachment survives the transformation from physical to digital, as long as the digital counterpart is easy to use and thus allows enough options for guests to actualize their greetings in the guestbook. A guestbook in this case could be assimilated to story-based games: when implemented in a user-friendly way, the physical game board or a computer are merely a platform to base the immersive story on, as a guestbook is a platform for its content, no matter whether it is physical or digital. The users themselves create the value of the guestbook. Therefore, as long as the product has very good usability, the core user experience is replicated from a physical guestbook to the digital one.

Photo albums are another product in which the user experience is replicated from a digital counterpart. The digital guestbook, much like a photo album, acts as a visual cue for memories and helps to keep important events in life in the memory. Extra media possibilities support this use case even more. It remains to be seen how the users of the product will eventually use digital guestbooks - will they work as a combined photo album and a guestbook?

As mentioned, the way the digital environment disrupts the traditions linked to guestbook use was seen as a positive side to digitization. The ability to delete created

content might be the reason why a digital guestbook was seen to encourage spontaneity. It also provides more media possibilities, which was clearly the most liked feature in the digital guestbook. The participants thought the versatile media was an opportunity for guests to express themselves in ways a physical guestbook could not provide. As content was agreed to be the most important aspect of a guestbook, more versatile, spontaneous and personal content is naturally warmly welcomed. Distinctive and personal signatures were seen as easier to create with multiple choices of media.

Even though the new media were welcomed, the participants did miss handwriting. It is an extremely individual feature in traditional guestbooks, and therefore the missing possibility can affect the user experience immensely. The user can use the drawing function in the digital guestbook to replicate handwriting, but it was not seen as a perfect substitute.

As mentioned in Chapter 2.2, the secret to success in re-implementing products in digital environments is to use known conventions, and provide new value with features that cannot exist in the original non-digital objects, but enable the user to ignore these features if they so wish. In the digital guestbook this was implemented by providing the user with multiple media choices while signing their page, but giving them the chance to only use text if they preferred a simple solution that most resembles the traditional guestbook. According to the participants, this was a successful design choice. Using known conventions copied from the physical guestbook is also a feature that makes the product easier to use and more familiar to the user from the start.

When examining user experience, usability cannot be ignored. Some usability issues along with few bugs were discovered during the evaluation phase when the participants were performing tasks given to them. These naturally have an effect on the overall user experience. In this case the interview and questionnaire data showed that the participants did not feel confident about using the digital guestbook and felt that it would require some practice for them to learn how to use the product. This is a sign of the usability of the product not being optimal. It is fairly natural for usability issues to appear during the first test session, but it does have an effect on the user experience and therefore impacts the data and results of this thesis. Only the first-time usage was studied - a follow-up study on continuous use after iteration is suggested.

One interesting way to use for future data gathering would be to test the guestbook in an actual party setting, where the context is suitable for the true user experience. In this scenario the data would be the actual signature pages, which could then be compared to pages of a physical guestbook. The content could be analyzed by the quality of the signatures based on the values stated by the participants of the guestbook in this thesis, and by the number of emotional characteristics in the content.

Interviews and questionnaires are always somewhat problematic, because people tend to report their own behavior through a subjective lens, often different than their actual behavior (Krug, 2006). People report themselves to be more active, more generous, and more rational than their behavior in the real world might suggest. Therefore, the credibility of the data of interviews and questionnaires is always somewhat debatable. Krug (2006) also warns interviewers of the phenomenon where interviewees do not state their honest opinions about a product in fear of offending the interviewer. The fact that the data from the interviews and the anonymously filled questionnaires was similar and supported the same findings, was a good sign of avoiding this pitfall.

The study participants, especially in the half-structured interview form, provided very versatile thoughts, opinions and data of emotions of the participants. The fact that the group of participants happened to be a rather diverse group with plenty of experiences and opinions when it comes to guestbooks and technology was also fortunate. By the basis of the variety of opinions and thoughts the participants expressed, the group of three people was enough to cover the most common needs of the users in this thesis. As a sample size, three people do not count as statistically significant, but with interview data, they provide a great deal of useful information that can be used as a basis for further study.

In the future the guestbook application could benefit from some small improvements and new features. Sharing is one of the features that was not implemented in the first version of the product, but discussed extensively with the participants on the evaluation phase. The decision not to implement sharing was the right one, since despite being excited about the possibility of sharing during the first interview, the participants eventually did see plenty of downsides to it and did not feel that extensive sharing would create a lot of extra value for the product. Sharing in its original extensive form would have rather averted the participants from using the product because of the problems they saw in it while using the application. The participants did see value in

storing the guestbooks in a cloud which would enable them to access them anywhere - this is a valuable feature to implement. In the future the guestbook might also remind their owners about certain celebrations with pop-up announcements about family birthdays or parties in their calendars.

The future version of a guestbook should also emphasize the importance of individual handwriting by either improving the pencil feature or simply by inserting more font alternatives. The known usability problems and should be fixed.

7 CONCLUSIONS

This thesis studied the question of how to successfully replicate the user experience of a physical product in a digital environment. For this purpose, a guestbook application was created. The study methods were based on review about the existing literature regarding digitization and user experience. First, a group interview was held to collect opinions, views and feelings about the user experience of a physical guestbook and the hopes and expectations from its future digital counterpart. The interview data served as a basis for the design phase, where content, interaction and user interface design was created based on personas, scenarios and wireframes. The product was then implemented and evaluated.

The study showed that the most important aspect in a guestbook is its content, and it is the factor that makes a guestbook appealing. The users do not feel strongly about a guestbook itself, but due to its content, do not throw it away either - even the simplest form of guestbook has some sentimental value. According to the interviews, a physical guestbook is seen as something delicate, elegant, warm, traditional and respected, and also more formal when compared to a digital guestbook. The digital guestbook is considered spontaneous, fun, unofficial and creative. Although the participants did see differences in the formality level of the guestbooks, it could be concluded the emotional attachment to a guestbook is attached to the content of the guestbook rather than the physical entity. A guestbook can therefore be seen as a mere platform for memories and emotional content.

While using the digital guestbook, the participants of the study made surprisingly few remarks of the lack of an actual book. The lack of a physical book was anticipated to be a larger issue when using a digital guestbook, but the participants were only concerned about the ease of use in the digital version. According to them, as long as a digital guestbook was to be as easy and straightforward to use as a traditional guestbook and provided the quick and easy access to the content and content creation, the user experience could be considered to be very similar to the original product. They were concerned, however, about the affordance of the tablet computer as a representative of the guestbook - not all guests at a party are going to understand a tablet computer on the table to be a guestbook, in comparison to an open book on a table in a party setting.

All in all, the participants of this study found use cases for both guestbook versions, and did find the digital guestbook to be more suitable to informal events and the physical guestbook to fit well in extremely formal and traditional events. The digitization, despite the doubts the participants had about the user friendliness regarding older people, was welcomed, as it enables using media impossible for the physical guestbook. The versatile options with different media were seen as enablers of creativity. Regardless of the new media possibilities, the participants did miss handwriting. This is a feature that can be emphasized in an iteration of a guestbook, and which, according to the participants, will create more positive similarity with the physical guestbook.

As speculated, using customs and utilizing the existing knowledge of the users and providing new features is the key to providing a good user experience to a user when it comes to replicating the user experience of physical products in a digital format. It is important to provide the user with new value, but let them use the product also in a traditional way if they so desire. The user can then ignore the added value for example during the first time of using the product, and after gaining the confidence to use the core features of the product, examine its new features.

During the evaluation phase some usability problems and bugs were caught in the product. These problems will naturally affect the user experience, and on the other hand, are natural to first test sessions. According to the interview data and the questionnaire, the participants did not feel confident of their use of the digital guestbook, which means the usability of the product is not optimal as it is. A similar study on the iterated, fixed product is advised. The use of the product in the evaluation phase was done outside the context of the normal use cases of a guestbook. The guestbook could be tested in a party setting, where the context would ensure possibly better data. According to the ICE score framework used to rank user experience measurement methods, field work naturally scored low on *ease*, which affected its score in a negative way and eliminated it from the methods used in the study. Field work did score high on *impact*, however, which awakens surmises about whether impact should have been stressed more in the scoring system. This surely would have taken more resources, but might also have provided better data as can be now seen.

The User Experience Questionnaire advises for the questionnaire to be filled immediately after the use of the product. In this study, the interview was held first. The sample size of three participants was not enough to make the questionnaire statistically

significant, and therefore the interview data was prioritized. This might have had an effect on the questionnaire data especially in regard to the negative feeling of safety and trust toward the digital product. On the other hand, it is useful to be aware of the weak aspects of the product in order to be able to develop them to serve users better in the future.

The results of this study reinforce the previous studies about user experience on digitized products: convention, easy access to content and ease of use with a low threshold to use the product are the factors that make a successful user experience which best replicates the original experience of the concept of a guestbook. The results can be used as a basis in product development where the goal is to digitize an existing physical product and retain the great user experience. A vast number of everyday products have already been implemented in digital environments, but as the technology provides more opportunities, new potential constantly rises in the field of digitization.

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APPENDIX 1: LIST OF TOP UX RESEARCH METHODS

List of 21 user experience research methods by Farrell (2017).

	TOP UX RESEARCH METHODS
Discover	Field Study Diary Study User Interview Stakeholder Interview Requirements & Constraints gathering
Explore	Competitive analysis Design Review Persona Building Task Analysis Journey Mapping Prototype Feedback & Testing (Clickable or Paper Prototypes) Write User Stories Card Sorting
Test	Qualitative Usability Testing (in-person or remote) Benchmark Testing Accessibility Evaluation
Listen	Survey Analytics Review Search-log analysis Usability-bug Review Frequently-Asked-Questions (FAQ) Review

APPENDIX 2: STRUCTURE OF INTERVIEW 1

Structure: First interview

1. How do you use a guestbook?
 - a. Text, photos and such in between pages?
 - b. In what kind of situations do you usually see a guestbook used?
 - c. Do you ever use a guestbook in a non-party setting? Do you browse it after a party?
 - d. How often do you use a guestbook?
 - e. How formal are the occasions you use the guestbook in? Can one use a guestbook in a very formal setting? What about in a very informal setting?
2. Why do you use a guestbook?
 - a. What is positive about guestbook?
 - b. What is negative about guestbook?
3. What is an ideal guestbook like?
 - a. What is it like physically?
 - b. What is the ideal content like?
 - c. Can you describe what a bad guestbook would be like?
4. Do you have an emotional bond with your guestbook?
5. Is the book-format an important factor to you in a guestbook? What would you think about a digital one?
6. If you could imagine yourself using a digital guestbook, what kind of features would make it ideal?
 - a. Would you be interested in sharing events with friends or family?
 - b. Would you be interested in adding photos, audio and video?
 - c. Would you be interested in editing a theme in a guestbook?
7. If a guestbook would be digital, could you see yourself using it in less formal events?
8. What would be positive about a digital guestbook?
9. What would be negative about a digital guestbook?
10. Are there any other thoughts you would like to share?

APPENDIX 3: WIREFRAMES

Start Screen



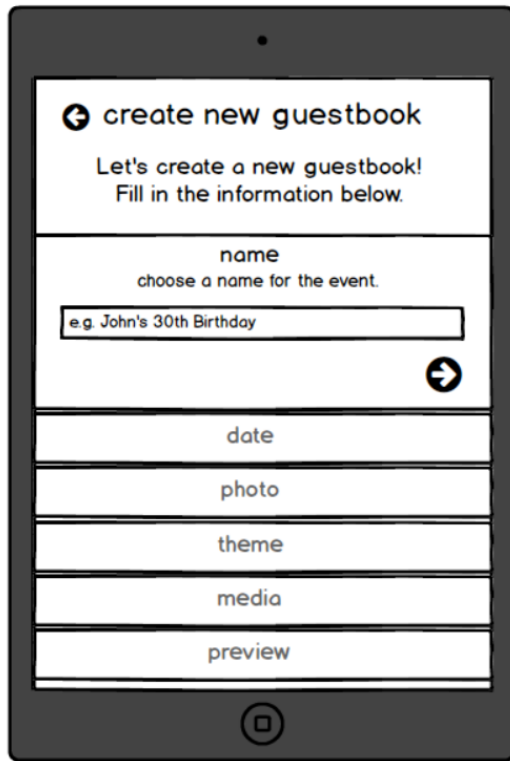
My Bookshelf



Start Screen



Let's Create



Choose Date

← create new guestbook

name

date
when will the event be held?

/ /

S	M	T	W	T	F	S
						2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	

→

photo

theme

media

preview

Choose Photo

← create new guestbook

name

date

photo
choose a cover photo from your gallery.

open gallery

→

theme

media

preview

Choose theme

← create new guestbook

name

date

photo

theme
choose a theme for your event.

→

media

preview

Choose Media Bundle

← create new guestbook

name

date

photo

theme

media
which media do you want your guests to use?

☒ photo
 ☒ video
 ☒ audio
 ☒ text
 ☒ draw
 ☒ sticker

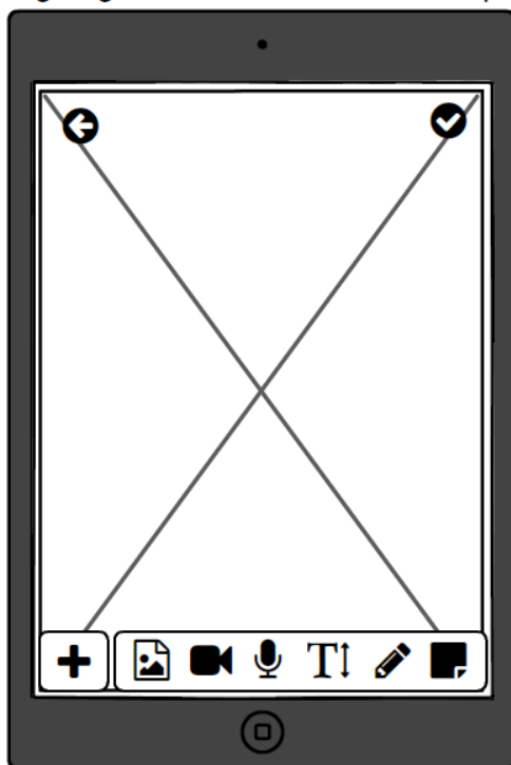
→

preview

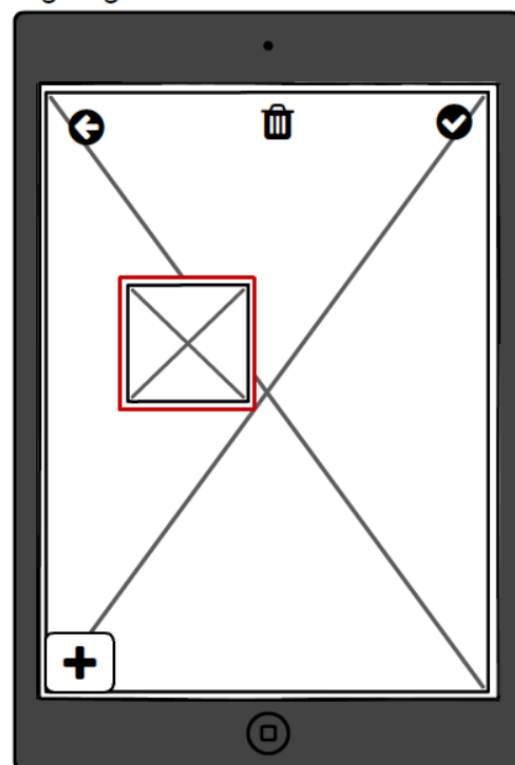
Preview of Guestbook



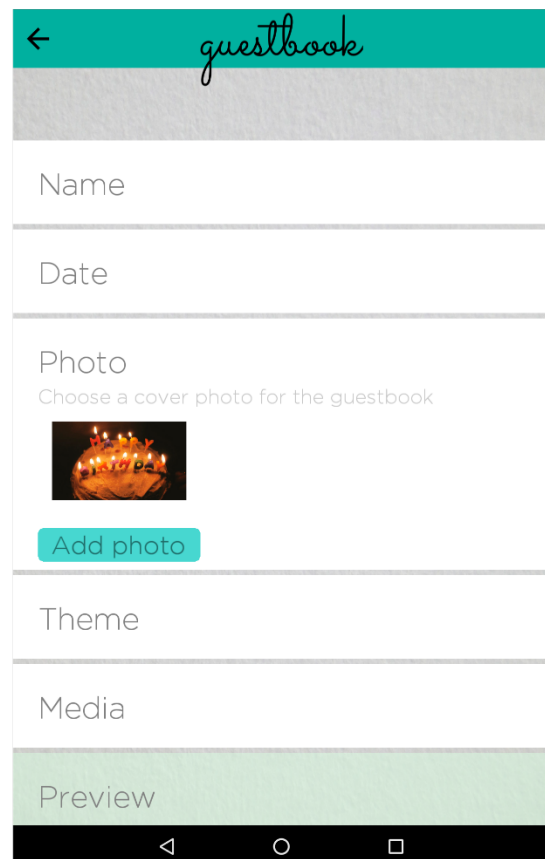
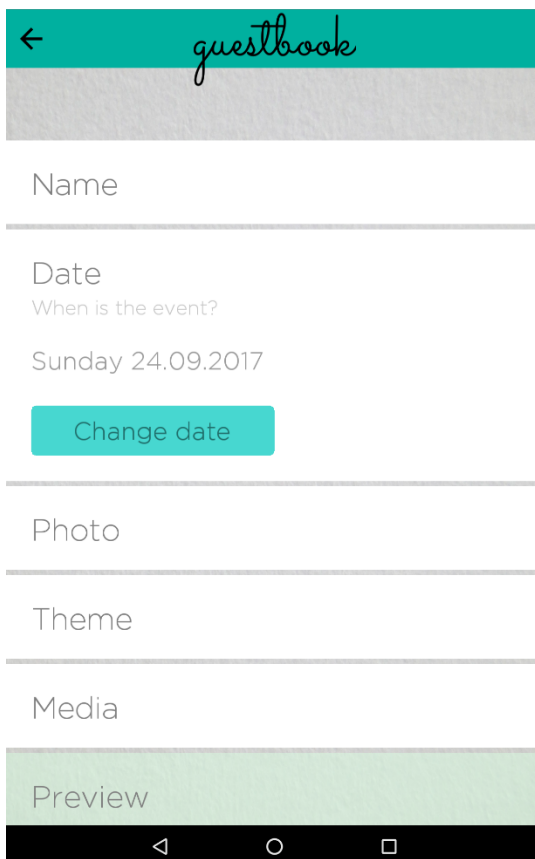
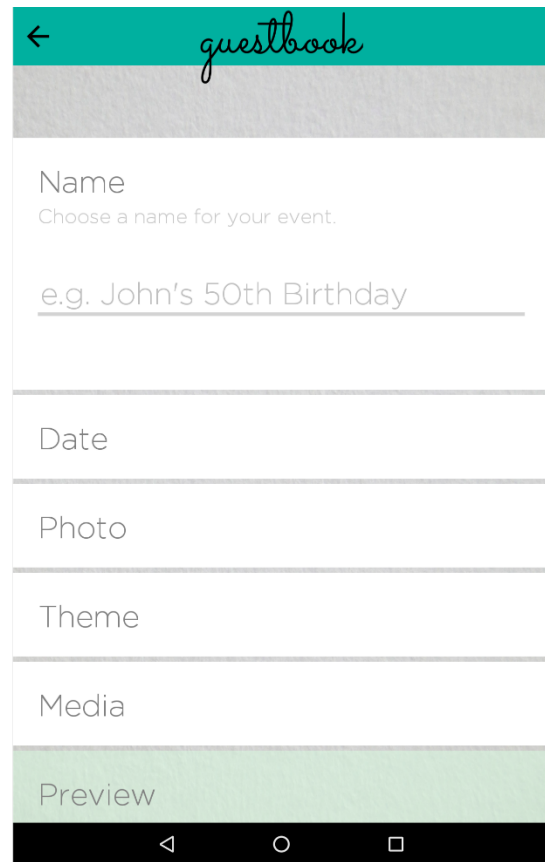
Signing in Process: Add-button Open



Signing in Process: Delete Element



APPENDIX 4: FINISHED APPLICATION SCREENS



←

guestbook

Name


Date

Photo


Theme

Media


Choose available media for guestbook signatures




text




draw



photo

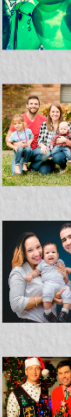




voice



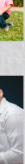
video

Preview







Ellie's 31st birthday
Sunday 26.08.2018



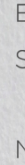
Neighborhood BBQ
Sunday 26.08.2018



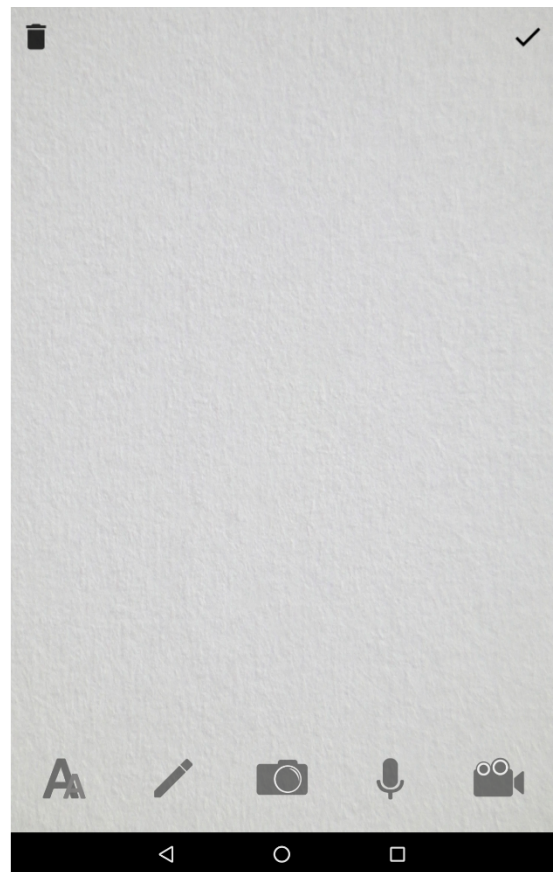
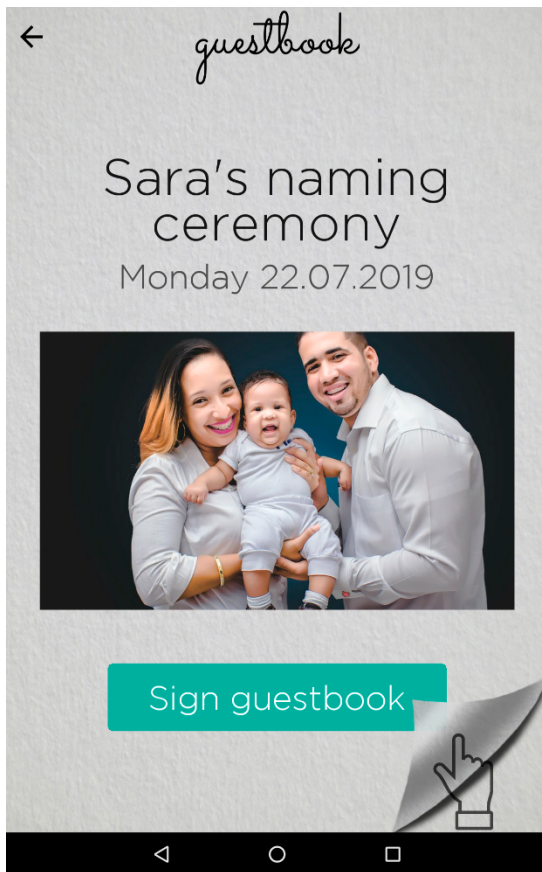
Sara's naming ceremony
Monday 22.07.2019



Christmas at Grandma's
Monday 25.12.2017



John's first birthday
Monday 24.09.2018



APPENDIX 5: EVALUATION INTERVIEW STRUCTURE

Structure: Evaluation phase interview

1. Physical guestbook

- a. A guestbook can be many different things depending on what you are used to. What is a guestbook in your mind? What are its main components?
- b. Do you use a traditional guestbook? How often do you use it?
- c. What are these guestbooks like physically? What is their content like? What kind of text? Are photos or other material used?
- d. Describe how you typically use a guestbook.
- e. In what kind of contexts do you use a guestbook? Do you browse it after the event has been held?
- f. Can a guestbook be used in extremely official surroundings? What about in very casual surroundings?
- g. What is an ideal guestbook like? What about a non-ideal?
- h. What are the pros of a guestbook? What about cons?
- i. What kind of an emotional bond do you have with a guestbook?

2. Digital guestbook

- a. Have you ever used a digital guestbook before? What was it called? What was the experience like?
- b. With a few sentences, describe your experience of this digital guestbook. Can you use three adjectives to describe it?
- c. In which ways did your experience differ from the experience of using a physical guestbook in your opinion?
- d. You were asked before about the contexts of use with physical guestbooks, and you answered [answer]. Do you think the contexts of use are the same or different with a digital guestbook?
- e. Can a digital guestbook be used in extremely official surroundings? What about in very casual surroundings?
- f. In what kind of surroundings would you use a physical guestbook, and in what kind of situations would you use a digital one?
- g. If you were to use a digital guestbook, compared to the physical one, how often would you browse it in between events?

- h. What do you think are the pros and cons in digitizing the concept of a guestbook?
- i. Which elements would make a digital guestbook desirable for you?
Would you share guestbooks yourself?
- j. Would you use a digital guestbook instead of a physical one?
- k. Are there any other thoughts or ideas you would like to share?

APPENDIX 6: USER EXPERIENCE QUESTIONNAIRE

Please assess the product now by ticking one circle per line.

	1	2	3	4	5	6	7		
annoying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	enjoyable	1
not understandable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	understandable	2
creative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	dull	3
easy to learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	difficult to learn	4
valuable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	inferior	5
boring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	exciting	6
not interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting	7
unpredictable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	predictable	8
fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	slow	9
inventive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	conventional	10
obstructive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	supportive	11
good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bad	12
complicated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy	13
unlikable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasing	14
usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	leading edge	15
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant	16
secure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	not secure	17
motivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	demotivating	18
meets expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	does not meet expectations	19
inefficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	efficient	20
clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	confusing	21
impractical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	practical	22
organized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cluttered	23
attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unattractive	24
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unfriendly	25
conservative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	innovative	26

	1	2	3	4	5	6	7	
ärsyttävä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	miellyttävä
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helposti opittava	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	vaikeasti opittava
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tylsä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	jännittävä
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kekseliäs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	perinteinen
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selkeä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	hämmentävä
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järjestelmällinen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sotkuinen
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vanhoillinen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	moderni